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Paradox 2.0, the top-rated Network, 386, and

Paradox® is both the first family in DBMS and the top-rated relational database. Software Digest has ranked Paradox #1 for the past 2 years; PC Magazine gave Paradox its "Editor's Choice" award and InfoWorld named it 1987 "Product of the Year" for Database Systems.

Now there's OS/2

Paradox OS/2 is the newest member of the Paradox family—more are on the way and they're all 100% compatible with each other.

Paradox OS/2 allows you to take advantage of powerful OS/2 features such as addressing up to 16 megabytes of memory and running concurrent sessions. And Paradox OS/2 even lets you start new OS/2 sessions from within Paradox.

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Harness the power of 386

Paradox 386 is powerful new DOS software for your powerful new hardware and it's designed exclusively for 80386-based systems. It also lets you ignore the old 640K limits and races through your data 32 bits at a time instead of just 16. It's a perfect solution for anyone faced with very large tables (tens of thousands of records or more) and/or large applications.

"As proof of Borland's commitment to delivering compatibility across diverse hardware and software environments, Paradox 386 and Paradox 2.0 can share the same databases and applications on a network.

Giovanni Perrone, PC Week

Paradox . . . it's the PC database-management system equivalent to turbo-charging an M-series BMW.

Giovanni Perrone, PC WEEK"

The Paradox Network really works

Network users, you need Paradox's multiuser capabilities. The network runs smoothly, intelligently and so transparently that multiusers can access the same data at the same time—without getting in each other's way. (But safeguards prevent multiple users from altering the same data at the same time.) And with screen refresh you get real-time data updates on your screen.

"[Paradox is] a true network application, a program that can actually take advantage of a network to provide more features and functions, things that can't be done with a standalone PC.

Aaron Brenner, LAN Magazine

[Paradox] elegantly handles all the chores of a multiuser database system with little or no effort by network users.

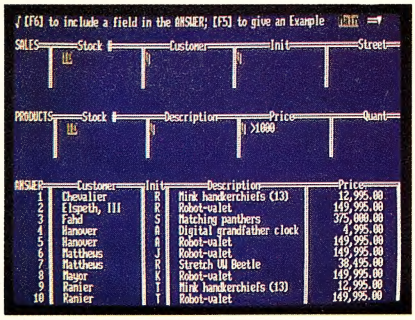
Mark Cook and Steve King
Data Based Advisor"

relational database, has now OS/2 versions!

"Query-by-Example" gives you the right answer, right now

Our "Query-by-Example" (QBE) technique is just one illustration of the technological leadership offered by Paradox for the past 2 years.

QBE is fast and simple to use. Simply call up a form and check off the information you want.



Without having to write a line of code, you can, for example, get answers to queries like: *Find all the items we sold for more than $1000 and tell me who ordered them.*

An artificial intelligence technique called "heuristic query optimization" gives Paradox's QBE the ability to figure out not just the right answer, but also the fastest way to get the right answer.

QBE makes high-speed links between one piece of data and another and quickly sees the relationships your question calls for.

PAL:™ A powerful programming language

PAL, the Paradox Application Language, is a full-featured, high-level, structured database programming language that lets you write sophisticated Paradox programs (scripts) and applications. It includes such powerful features as looping constructs, arrays, branching, procedures, and a full set of functions.

"Most people we meet who give Paradox a try, end up switching to it . . .

Mark Cook and Steve King
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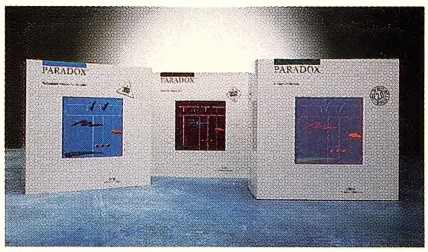

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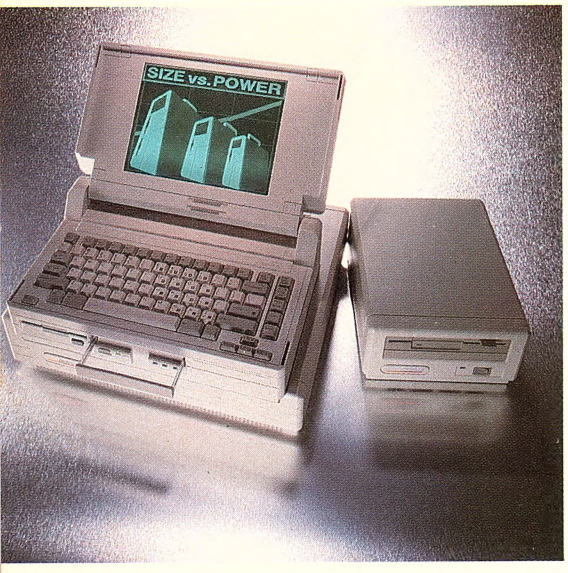

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- The Zoom HC 2400 internal modem: as smart as a Hayes and a lot cheaper
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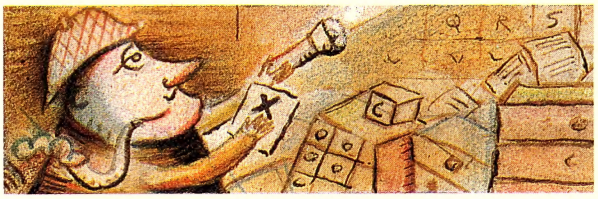

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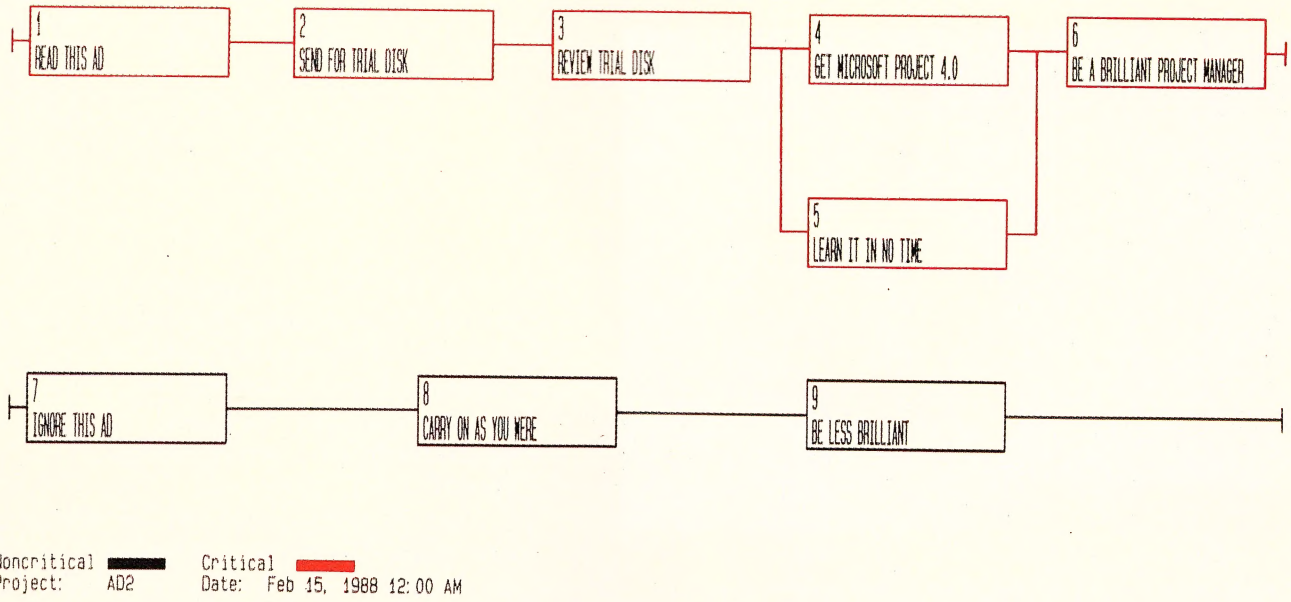

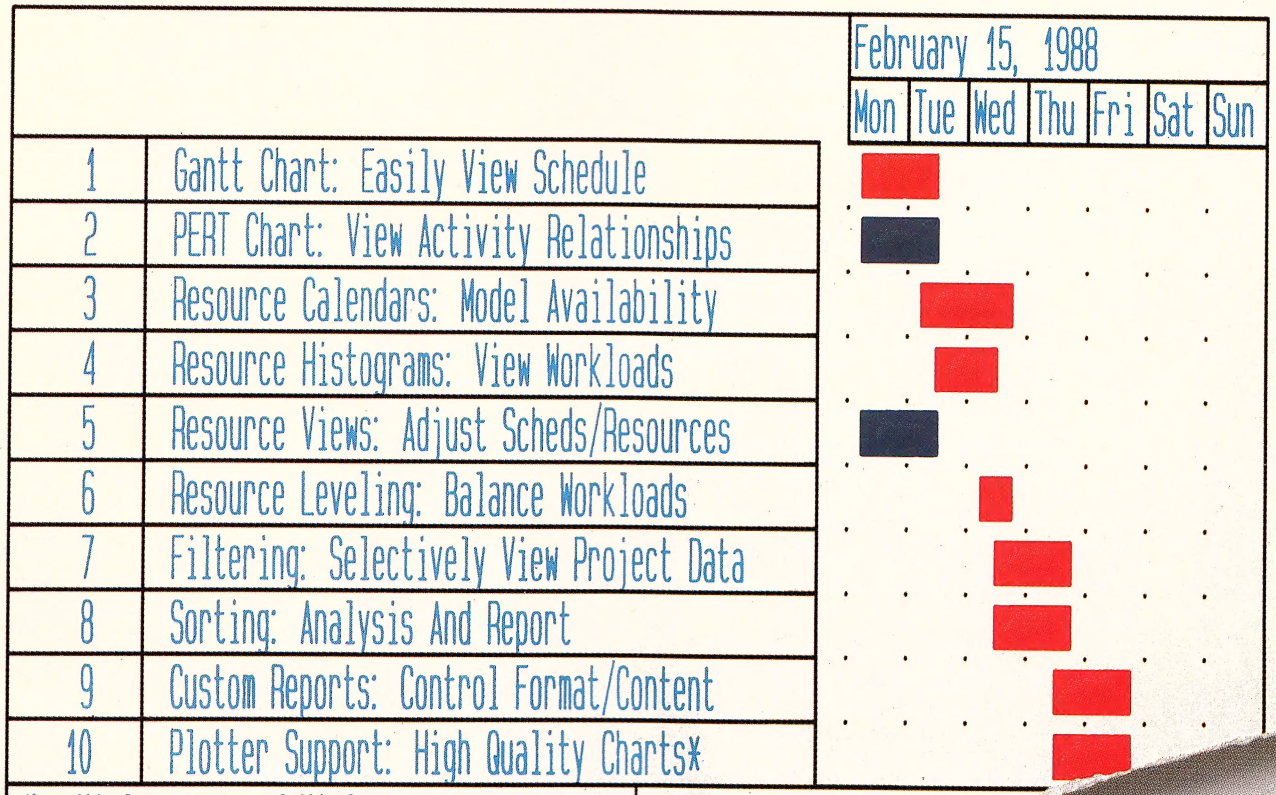

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A Taste for Accounting

Ralph Soucie applied his accountant's wiles to this month's Buyers' Guide.

JOHN MAHER

For most of us, dealing with financial matters ranks on a par with going to the dentist or getting a speeding ticket. Contributing Editor Ralph Soucie understands. In 11 years as an accountant (the last 8 as a CPA), he's helped hundreds of small and medium-size businesses get their finances in order.

Since 1983, Soucie has earned a reputation as *PC World*'s expert on spreadsheets and accounting applications. This month, he prepared our buyers' guide to vertical accounting packages, "Accounting Tools of the Trades."

"Most businesspeople have little patience for dealing with the details of accounting," Soucie says. "I try to make the process go a little smoother, but I can never totally relieve my clients of the record-keeping burden. That's where the right software is invaluable."

What makes vertical applications different? "General accounting software is designed for the back office—the general ledger, payables, and receivables," Soucie explains, "while vertical software takes into account how an individual business runs. A medical application, for example, might let you prepare an invoice before the patient leaves the office, which means you have a better chance of getting paid."

What happens if you choose the wrong package? "A lot of money just disappears. A vertical package is a risky investment, because its tentacles extend into every aspect of your business. But the potential payoffs are so great, it's worth taking a chance."

The more information you have, the more likely you are to make the right product choice. That's why *PC World* provides reader service cards: Using the postage-paid cards, you can request product information directly from a manufacturer. Beginning this month, we've made it easier for you to find reader service numbers by printing them at the end of every "Product Outlook" item, every review, every buyers' guide listing—everywhere you're likely to find a product lead worth pursuing.

Also in this issue: We review software that helps you find a word or phrase on a crowded hard disk ("In Search of Forgotten Text"), tackle the big jobs ("Project Management—for Professionals Only"), run half a dozen DOS applications at the same time ("Multitasking Without OS/2"), or improve communications on your local area network ("LAN E-Mail: Power to the Work Group"). And check out our Feature section, where East Coast Editor Eric Bender offers an early glimpse of OS/2 Extended Edition and an update on Lotus's *Notes* and other groupware packages.

Ed Bott

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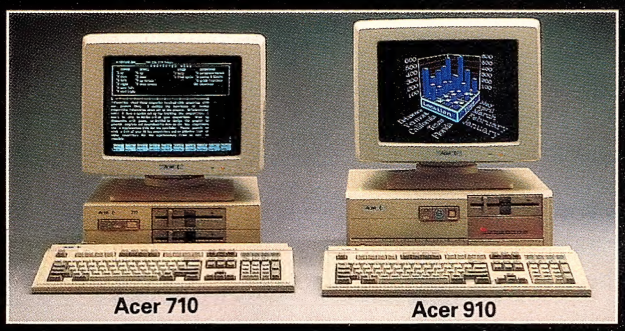

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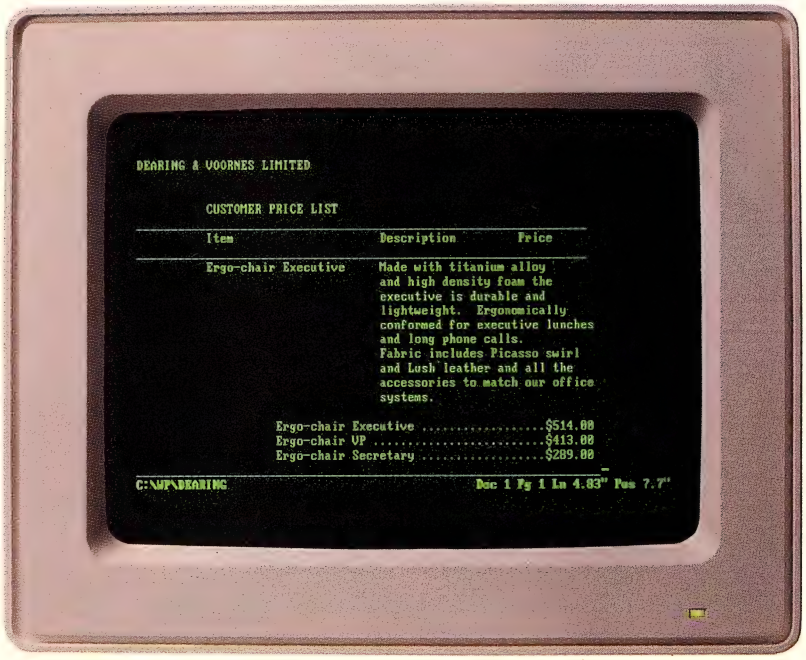
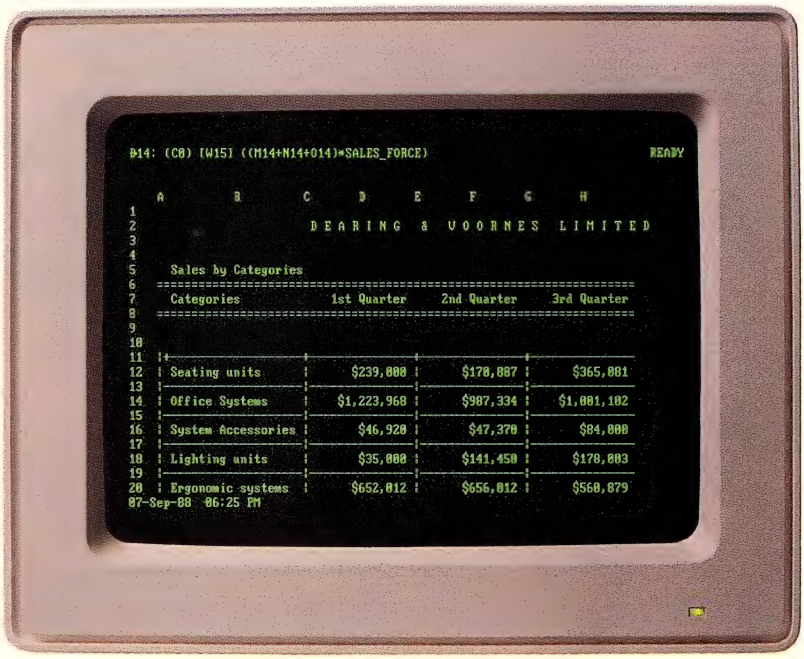
What you've been doing.



On your 286,
you've been making any task look complicated.



On your 386,
it hasn't been incredibly exciting having all that power.

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You'd expect a program this powerful to require a more powerful machine. But we consistently create software that makes

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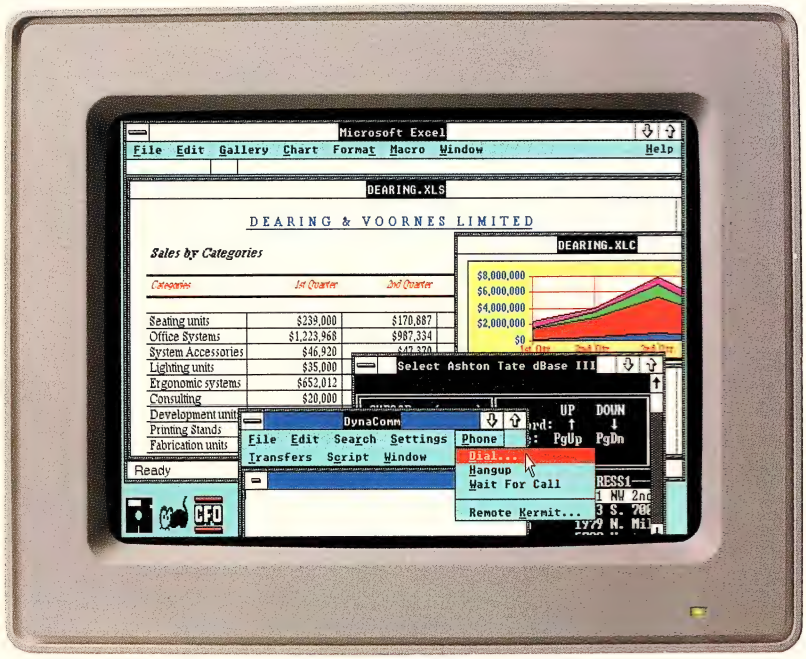
What you could have been doing.

With Windows/286,
you could have been seeing things much more clearly.



With Windows/386,
you could have been seeing a lot more things much more clearly.

the best use of your present hardware.

For example, Microsoft Windows/286 will work with as little as 640K and instantly make your machine more sensitive, intuitive and highly visual. It gives you the ability to run every Windows application available.

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Microsoft Windows/386 will give you everything that Windows/286 gives you. Plus multitasking with most DOS applications. Now you can finally utilize the speed and power of any 386 machine.

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Cloners Challenge IBM

Vendors of Compatibles Band Together to Support a Bus That Compares With MCA

In a widespread revolt, dozens of system and peripherals vendors have pledged support for a new bus design that they claim offers the same functionality as IBM's much-touted Micro Channel Architecture (MCA). A nine-member core group spearheaded by Compaq Computer has proposed a bus specification challenging IBM's attempts to move customers from the AT-style input/output standard to its proprietary Micro Channel. The rebel group's specification extends AT compatibility, providing 32-bit data paths for add-on boards and peripherals, and arbitrates conflicts among multiple intelligent devices such as disk controllers and network cards. The key element in the compatible makers' strategy is that unlike MCA, the Extended Industry Standard Architecture (EISA) won't sacrifice compatibility with existing peripherals to get these benefits. EISA-equipped systems are not expected to ship until year-end 1989, when Intel Corporation will offer a supporting chipset. A typical EISA configuration is likely to expand upon the dual-bus architecture commonly found in 80386 computers today. One bus will provide direct links between 32-bit memory and the central processor, while the I/O bus will manage the system requests of today's AT-style peripherals and an upcoming crop of 32-bit I/O devices. IBM, which was invited to join the consortium but declined, claims it deserves royalty payments for patents held on the AT bus. Compaq president Rod Canion maintains that EISA's design raises no new legal issues. In the face of the EISA challenge, IBM executives reaffirmed the company's commitment to the Micro Channel and contended that the new specification only validates their 18-month-old claim that the AT bus has run out of gas.

Model 30 286 Released

New CPU Raises Questions About IBM's Support of Micro Channel

Apparently softening its determination to eradicate advanced systems with AT-style bus architecture, IBM has introduced an 80286-based Model 30 PS/2 based on just such an architecture. IBM abruptly stopped shipping its best-selling PC AT in the summer of 1987 in order to move advanced system buyers up to PS/2 models equipped with the Micro Channel. Industry analysts cite that action as the reason for IBM's loss of market share to competitors' PCs equipped with AT-style bus architectures. Perhaps indicating IBM's ambivalence on the subject or its desire to protect sales of MCA-equipped 286-based designs, the Model 30 286 joins the hotly contested 286 race somewhat handicapped. Its base configuration includes a 10-MHz one-wait-state processor, a mere 512K of memory, three 8/16-bit slots, and a single 3½-inch floppy for $1995. An optional 20MB hard drive offers only an average access time of 80ms. Citing past promises to upgrade the Model 30, IBM president William Lowe insisted, "We are not abandoning the Micro Channel."

LaserJet Upgraded

State-of-the-Art Paper Handling Available, but Not PostScript

The Hewlett-Packard LaserJet family is likely to acquire PostScript printing someday soon, but that capability is conspicuously absent from the newest release of the printer. Instead, declaring that it wants to set a new paper-handling standard, HP has launched the LaserJet IID with three much-requested capabilities. Equipped with the Canon SXD engine, the LaserJet IID gains a second 200-sheet paper-feeding bin, the ability to print on both sides of the paper from either or both bins, and a separate 50-unit envelope-feeding option. HP grabbed early market leadership in March 1984, introducing a $3495 LaserJet eight months before Apple launched its $7000 LaserWriter. While Apple has emphasized desktop publishing, HP has positioned the LaserJet as an economical general office printer. That meant passing up PostScript licensing, which Product Marketing Manager Cathy Lyons says would boost the IID's price from $4229 to around $6000. HP and PostScript developer Adobe Systems have been discussing the issue for years, she adds, and PostScript is likely to appear as an upgrade option sometime in the near future. The LaserJet IID also lacks the video I/O port that QMS's JetScript PC board uses to send PostScript files to the Series II. Lyons wouldn't say why HP felt compelled to eliminate this port, the most popular way of adding PostScript to the LaserJet, but added that "HP is looking at another solution that will let more than one user share the capability."

Ashton-Tate Releases Compiler, Translator

Seeks to Bring Fallen-Away Developers Back to Its Language

Moving to stem competitors' inroads into its *dBASE* franchise and bring errant developers back into the fold, Ashton-Tate has introduced both a dialect translator and a full native-mode compiler for *dBASE IV. dBASE Professional Compiler,* which will be included free in a first-quarter 1989 update of *dBASE IV Developer's Edition,* compiles applications to executable binary code. The unmodifiable applications can then be distributed to an unlimited number of users, none of whom need a copy of *dBASE IV*. Before year-end, Ashton-Tate also will ship *STEP IVWard,* an $89.95 translator of applications in the *Clipper, Foxbase,* and *Quicksilver* dialects into *dBASE IV*. The $1295 *dBASE IV Developer's Edition* version 1.0 and the $795 *dBASE IV,* both of which began shipping September 30, already include an interpreted compiler which produces hexadecimal code and still requires the base program to run. The two compilers have complementary attributes. *dBASE Professional Compiler* was designed by former Ashton-Tate programmer Jeff Cooper, now of Apex Software, who began work on a similar product in 1983. Fear of losing *dBASE* sales prevented Ashton-Tate from releasing it, admits President Ed Esber. Since then, however, competitors have shipped between 100,000 and 180,000 compilers and an untold number of *dBASE* clones. Esber says that Ashton-Tate now recognizes that it can tap the compiler market without hurting *dBASE* sales.

Compaq Shifts Emphasis

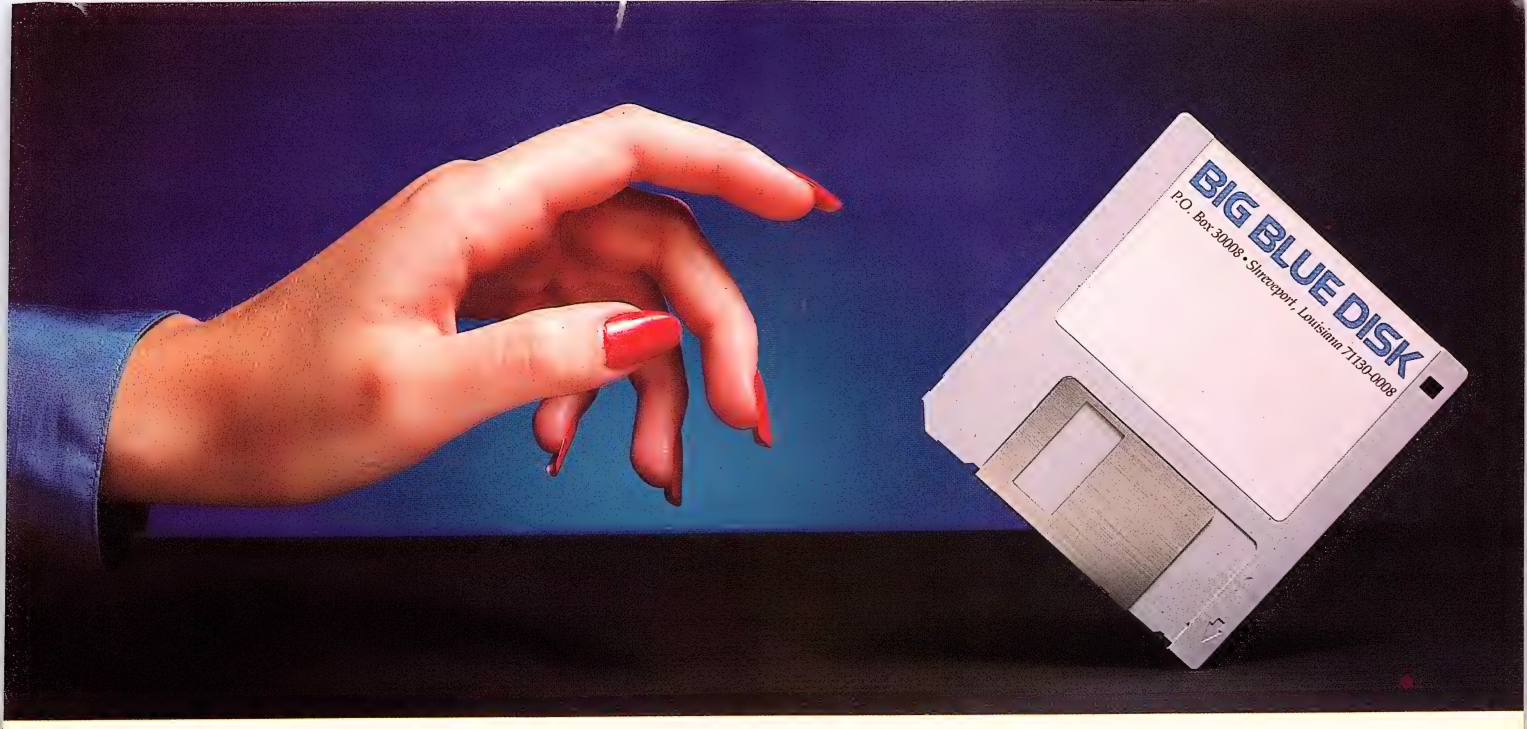
Profiles Get Smaller, Prices Cheaper

Compaq's recent introductions of a long-awaited laptop and a new small-footprint desktop computer (see the Compaq preview in this issue) represent not only new technology but also a tilt in the balance of the Compaq line toward downsized, more affordable computers. The new Deskpro 386/20E, a 20-MHz 80386 computer, has the same 15-by-16-inch footprint of Compaq's 80386SX-equipped boxes introduced in August. Both save slots and inches by putting serial ports, parallel ports, and graphics and disk controllers on their motherboards. Because of these products, Compaq has decided to discontinue the large form-factor Deskpro 386 and Deskpro 386/20, offering the 386S and 386/20E for about $1500 less, respectively, than the larger machines. The Deskpro 386/25 will maintain its larger footprint for customers whose applications require more slots and more internal storage. Meanwhile, Compaq's new 12-MHz 286-based SLT 286 may be the first laptop that does double duty as a small desktop without compromising functionality. Attacking the problems common with portables—poor display and limited expandability—the SLT 286 sports a VGA-compatible LCD screen and optional desktop subsystems for additional drives and expansion boards. Vice President Mike Swavely says Compaq decided to use a 286 processor and sell the accompanying desktop subsystems separately in order to keep the weight under 14 pounds, hold the price under $5500, and reach "the mainstream."

Introducing Xerox Presents

Desktop Presentation Tool Is First to Migrate From the Mac

Xerox began shipping the first of several products resulting from agreements with leading Macintosh graphics provider Cricket Software. *Xerox Presents* is billed as a full-feature graphics system for business presentations. While Technical Manager Walter Schwartz maintains that the product provides full-feature drawing, chart-building, and word processing modules, he adds that the principal added value in *Xerox Presents* is its ability to simplify the organization and management of visual materials such as 35mm slides. The package can create sophisticated slide shows on a PC, and by taking advantage of the multifile and clipboard capability of *Microsoft Windows, Xerox Presents* lets the user create fresh presentations by combining parts of others. The program can import ASCII text, data from most spreadsheets including *1-2-3,* and graphics files in various formats, including TIFF, PCX, and EPS. Since few presenters have graphic arts backgrounds, *Xerox Presents* ships with more than 200 customizable style sheets that offer professional advice on choosing fonts, colors, and layouts.



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Ami Beats Microsoft Word

First Full-Function Word Processor Under Windows Comes From Samna

This month Samna Corporation is shipping its *Ami* word processor, which may well turn out to be one of the most significant applications to run under *Microsoft Windows*. Although Microsoft reports there are 650,000 *Windows* units installed worldwide, the long list of programs running under the environment is dominated by graphics-intensive specialties from obscure vendors. Conspicuously absent from that list is Microsoft's *Windows* version of *Word*, whose ship date has not been announced. In the meantime, Samna's *Ami* fills the gap for the most popular application on a PC. Priced at an aggressive $149 until the beginning of February and $199 after that, *Ami* capitalizes on the *Windows* interface to provide an intuitive menu system for quick learning and <Ctrl>-*key* combinations for advanced users. Users get a WYSIWYG preview of printer output and can use either their own or one of Samna's 25 preformatted style sheets for advanced page formatting without slowing data entry. Users also can place a "frame" for a scalable graphic within a document, and text will automatically flow around or even behind the graphic.

Adobe Illustrator Ships

Top Mac Graphics Program Demands a Hefty Hardware Platform

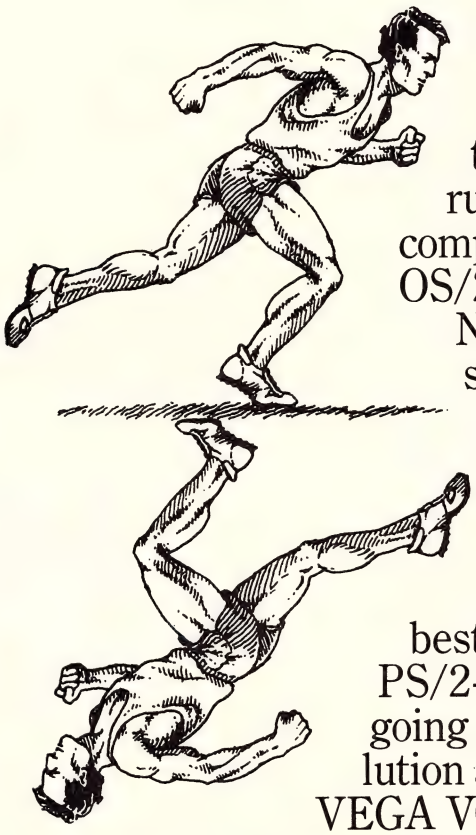
Adobe will bring its best-selling graphics program for the Macintosh to PC compatibles, but the software will require an 80286 machine or better with more than 1MB of memory. A DOS version of *Adobe Illustrator* will be available by year-end, says President John Warnock. The company, whose flagship is the PostScript page description language, has decided to gamble that the graphic artists, CAD users, and desktop publishers *Illustrator* targets will invest in 80286 or 80386 computers with expanded or extended memory and a hard disk. Warnock says that company research indicates that the program is likely to sell a lot of 80386-based computers. "The productivity increase is so great that cost justification is a no-brainer," claims Warnock. "*Illustrator* on the Mac was able to take on $100,000 CAD/CAM packages." Even so, bringing the functionality of the Macintosh version to the PC is like "fitting an elephant in a shoe box," he says. Adobe has provided virtually the same functionality by tapping the *Windows* graphic user interface and employing a data-swapping scheme that exploits conventional memory, expanded memory, and virtual disk storage in order to manage graphics files that typically range between 50K and 300K.

Intel Revamps AboveBoard

Expanded Memory Board Line Gains More Memory and Multitasking Capability

More than a year after announcing software support for multitasking in expanded memory, the Intel Personal Computer Enhancement Operation (PCEO) has begun to provide the hardware required to make it all possible. New models of the AboveBoard support multitasking and more memory for slightly higher prices. The $795 AboveBoard Plus is an add-on memory card that supports the multitasking feature outlined in the August 1987 introduction of the Lotus/Intel/Microsoft Expanded Memory Specification version 4.0. With this board, users of Quarterdeck's *Desqview 2.01* can load and execute multiple applications simultaneously. Users of *Microsoft Windows/286* can load multiple DOS applications into memory, but run only one at a time; however, multitasking is achieved with applications written specifically for *Windows*. Intel has a PS/2-compatible version of AboveBoard Plus and one with additional I/O ports. The new boards, notes Intel PCEO co-general manager Rich Bader, bring DOS users the same multitasking capability found in OS/2, a capability that AST's Advantage expanded memory board line has provided since 1986. The Advantage family has outsold Intel's AboveBoard line by roughly 2 to 1, claims AST executive vice president Tom Yuen, and roughly 150,000 of those units were shipped since EMS 4.0 debuted. Additionally, Intel, Lotus, Microsoft, and AST will make available to software vendors a new eXtended Memory Specification (XMS) driver that will give owners of 286- and 386-based PCs with more than 1MB of memory another 64K of extended memory.

How To Run Backwards & Forwards At The Same Time.



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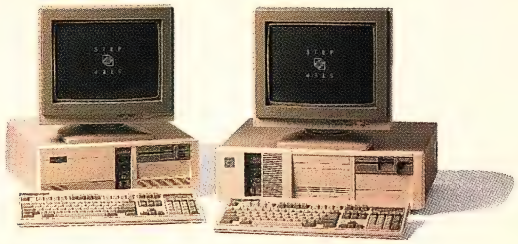

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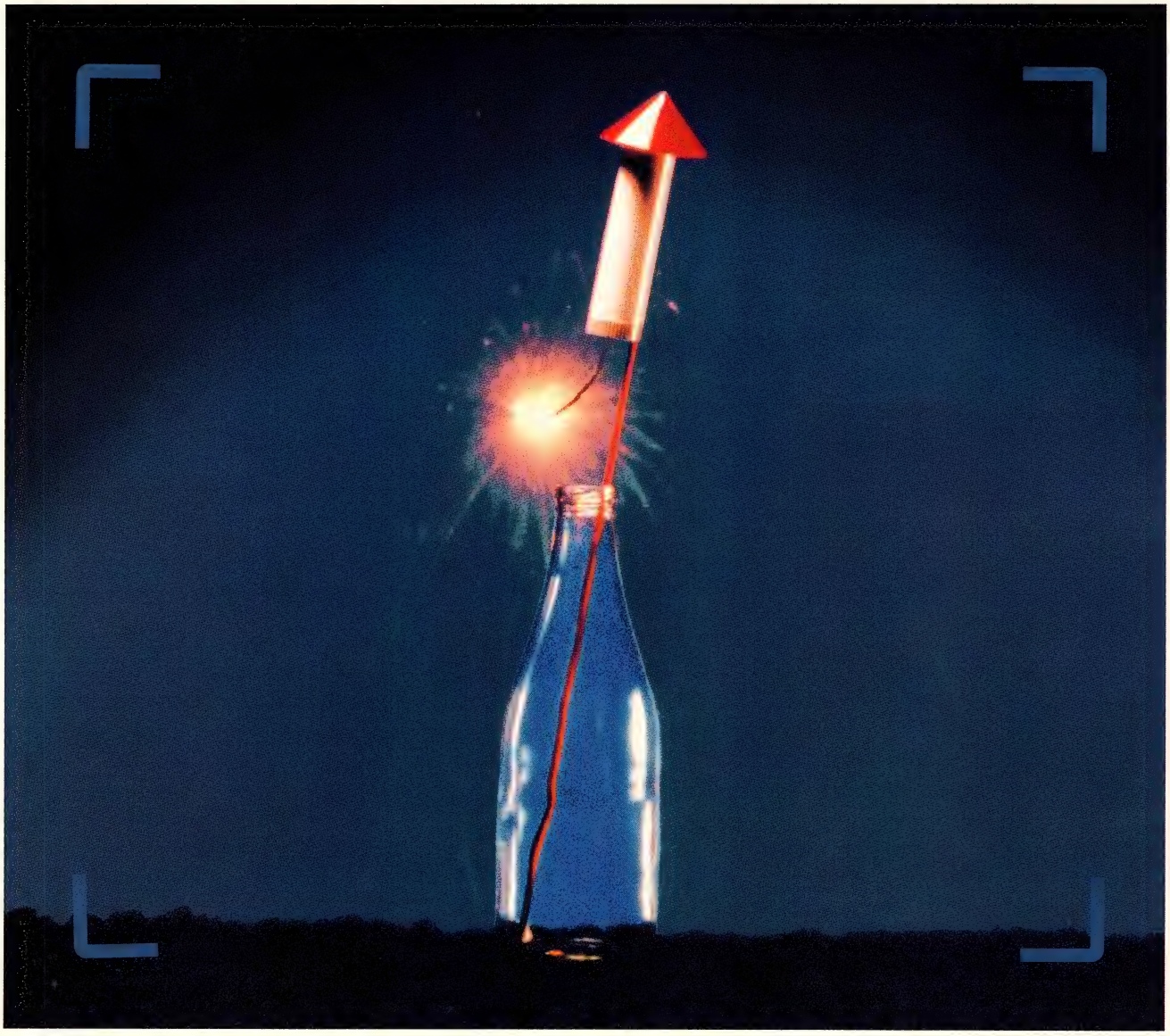

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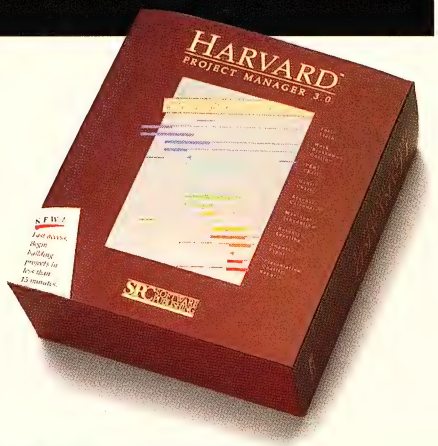

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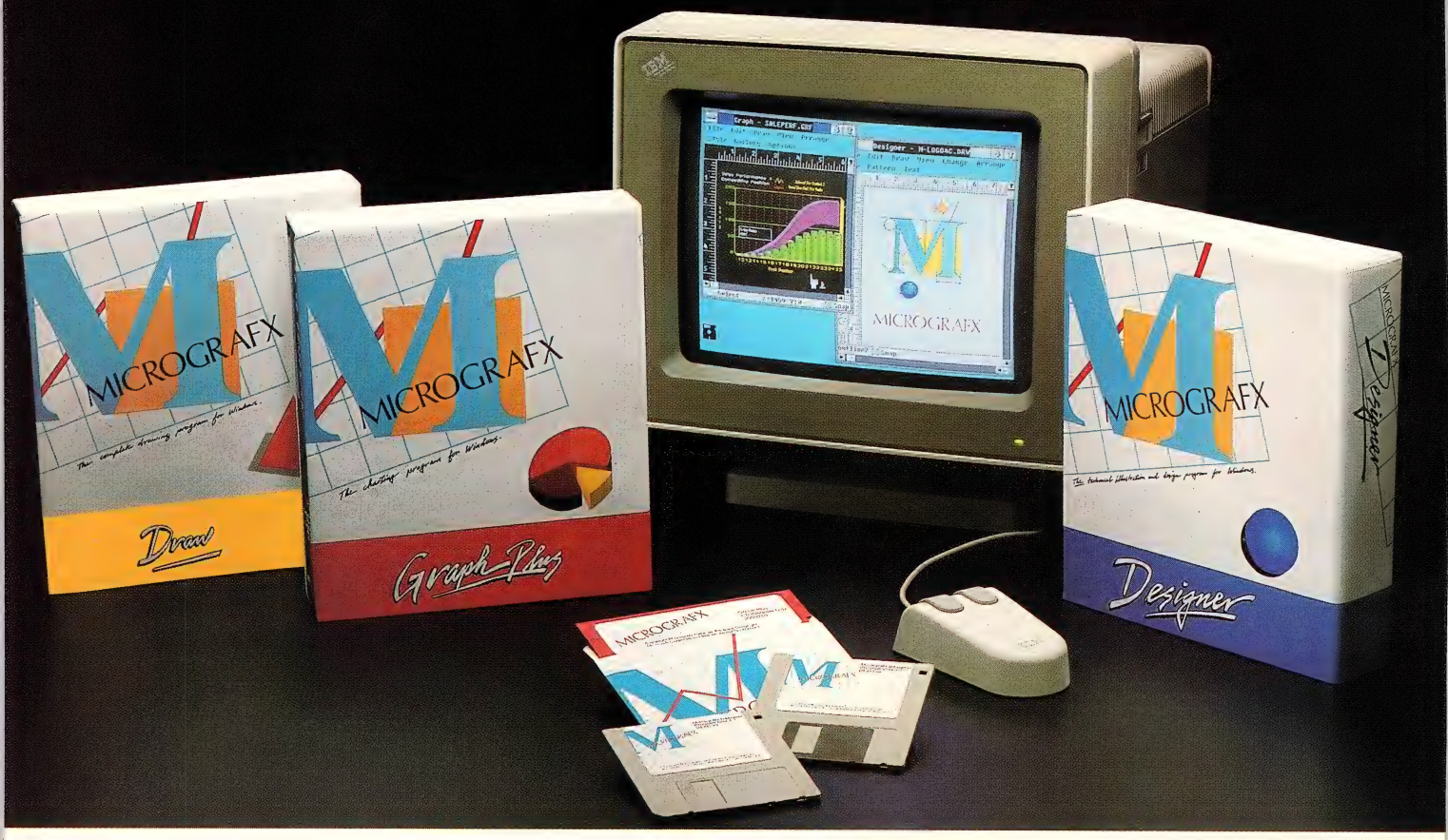

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EISA: IBM's Canary in a Cage

The EISA bus standard is a warning to IBM that users are fed up with proprietary technology and trickle-down innovation.

Will Big Blue get the message—or is it too late already?

Richard Landry

FRED STIMSON

Everyone knows the old trick miners used to avoid the dangers of odorless but deadly coal gas: Bring a caged canary down into the shaft with you. If the canary dies, that means it's time to clear out—and fast.

IBM's got its own canary nowadays—the new EISA bus standard proposed by AST, Compaq, Intel, Tandy, Zenith, and a host of other PC manufacturers (see *Top of the News* in this issue). But Big Blue doesn't seem to appreciate the service those companies have performed by underscoring the fatal flaws in its own PC strategy. Too bad. By doling out new technology in bits and pieces, and by offering competitors the choice of paying exorbitant license fees or facing a long legal battle, IBM is ensuring itself a place in the history books reserved for those who lost big by not playing smart.

EISA represents the first time that PC clone manufacturers have challenged IBM's right to set the standards for personal computers, but it's not the first time they've led Big Blue in thoughtful innovation. Companies like Compaq, Dell, ALR, and Everex have all discovered a way to wring high performance from the AT bus while maintaining compatibility with it.

Meanwhile, either through incredible oversight or by deliberate design, IBM has developed a knack for releasing products that offer too little, too late. In 1985, IBM was one of the last companies on the block to produce an 8-MHz 286-based system. Despite its intimate knowledge of Intel's plans for the 386, 386SX, and 486 chips, Big Blue insisted that Microsoft design OS/2 for the 286 platform. Finally, with the Micro Channel, IBM devised an architecture that's incompatible with users' previous hardware investments and expensive for add-on developers to implement, while lacking the power or peripherals to really make it hum.

All this is even more baffling when you consider that OS/2 was designed to usher in an era of innovation in PC architectures. Because it insulates application software from the underlying hardware, OS/2 promises to run on many different kinds of systems. PC manufacturers will be free to produce machines that differ significantly in the way they handle both memory and peripherals. The smartest companies—like Compaq and Sun—

(continues)

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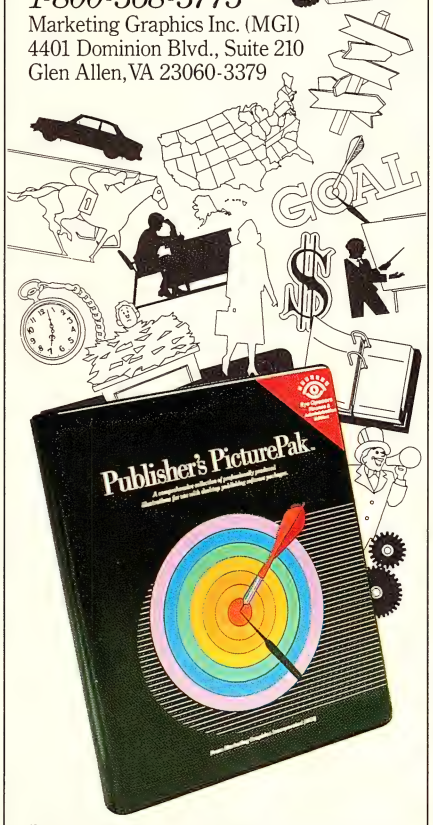

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Circle 294 on reader service card

will stay within industry bus standards while innovating in those other areas to gain a performance edge. That's been the case with UNIX-based engineering workstations for several years, and it's coming to pass in the PC arena now.

Furthermore, most users don't stand to benefit in the short term from any bus architecture that fractures the AT standard. As Compaq's chief engineer Gary Stimac readily acknowledges, neither the Micro Channel nor the AT bus is being stretched to its limit by the current generation of software and peripherals. Microsoft has plans for a multiuser, multiprocessing version of OS/2, but those are taking a backseat to its efforts to support the 386 chip first. Meanwhile, Intel's Connection CoProcessor is proof that the AT bus—and DOS—is capable of handling intelligent peripheral devices.

EISA—and perhaps the Micro Channel—will come into its own only in an era when PCs can truly replace minicomputers and mainframes as the cornerstones of office computing. When that time comes, it won't matter if you bought an old-fashioned AT compatible or a newfangled PS/2 Model 50 Z today. You won't be shuffling your old add-in cards into the new system. You won't be stuffing your old box with new multiprocessing cards, either. You *may* find yourself wondering why you bought a low-performance PS/2 when a high-performance, industry-standard machine was available for about the same price.

The Micro Channel isn't mythical technology. The performance gains it can potentially provide are great. But lately IBM hasn't focused on proving the Micro Channel's benefits to users who might be willing to suffer some inconvenience and pay more for world-class power. Instead, the company's been sticking vendors for up to 5 percent of revenues as the price they must pay to produce Micro Channel clones. Once it's complete, the EISA specification will be placed in the public domain, basically free for the taking. No wonder all the major PC manufacturers managed to sit down at the table and hammer out a common design.

The Micro Channel's not dead yet. The first EISA products won't roll off the assembly line until sometime in late 1989. IBM, meanwhile, is the best-endowed computer company in the world, with a global army of distinguished scientists and engineers. If the company has the guts, it can validate its claims for the Micro Channel in the nine-month lead time its competitors have provided. But it's time for IBM to stop treating users simply as pawns in a war between vendors and to start delivering true next-generation power at a competitive price. Only that will keep the market from slipping through Big Blue's fingers. Legal maneuvering will reap the scorn it richly deserves.

As always, I'm interested in your opinions on this or any other subject. Write to me at *PC World*, 501 Second St., San Francisco, CA 94107, or send an MCI message to Richard Landry/301-3685.

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The 286/14 is also powered by an Intel 80286 CPU, but operates at 14 MHz (with zero wait states) for even faster performance. It, too, comes equipped with 1024KB memory, 1.2MB floppy disk drive, serial/parallel/game ports and a 101-key keyboard. No doubt about it — it's a hot machine and a dream to fly!

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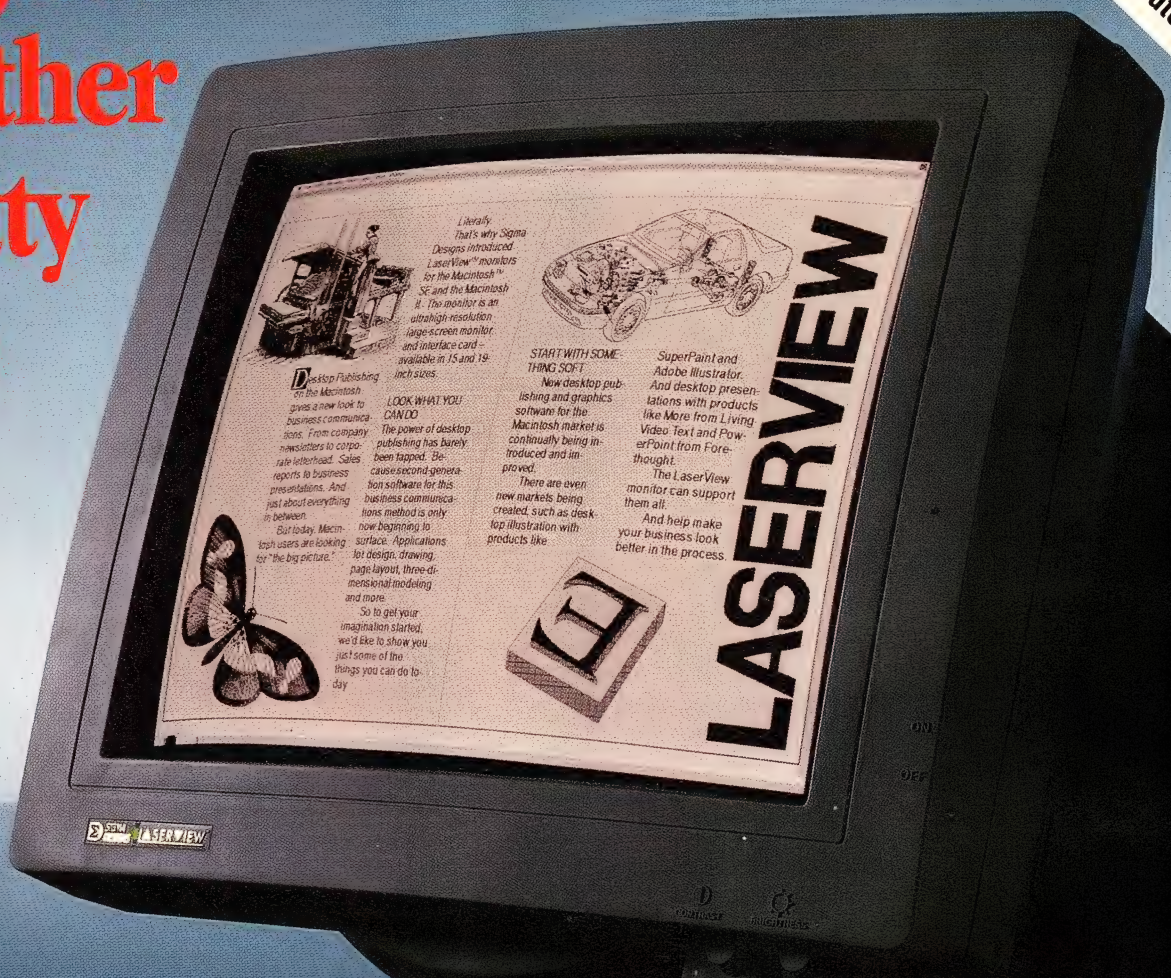

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S I G M A D E S I G N S

LETTERS

Reactions and responses from the PC World community

IBM Royalty Rap Off Base

Regarding David Bunnell's recent column ["IBM's Imperialism: Boon or Boomerang?" *PCW*, August 1988], I'm not sure I heard it right: IBM should let anybody use its patents any way they want, for free, so that U.S. personal computer users won't be deprived of "the right to choose the kind of system they want to buy"?

I suppose people can voluntarily give away their intellectual property, but there are reasons why we have intellectual property laws. The point here is not whether IBM has a market-share "birthright," but rather that the company has specific legal rights and is exercising them. Surely Mr. Bunnell would be unhappy if people started distributing his column as their own.

Alan S. Hejnal
Upland, California

The point of my column was that IBM is cross-licensing PS/2 technology to American companies while demanding retroactive royalties from Asian companies on old PC technology. Users should be aware that the result of this tactic could be higher prices for personal computers—and fewer choices. —David Bunnell

The Future Is Here

I read with interest Stewart Alsop's column ["A Manifesto for the Future," *PCW*, August 1988] calling for a computer that "actually does something new, instead of just doing the same old thing even faster." I searched for a computer using criteria similar to Mr. Alsop's and to my surprise found that such a computer exists today. It delivers 256 colors from a palette of 16 million (or 256 gray levels if you prefer) in 640 by 480 resolution, and has a built-in stereo audio chip that produces high-quality digitized sound. It communicates easily with PCs, minis, and mainframes; it's easy to network; and its operating system has most of the features promised by OS/2.

The computer? The 15.7-MHz Apple Macintosh II.

Hisham A. Almufti
Bethlehem, Pennsylvania

Best of Shareware: Addendum

It's unfortunate that George Campbell missed a real gem in his "Best of Shareware" buyers' guide [*PCW*, August 1988]. I'm speaking of *QEdit*, a feature-rich ASCII-file editor available from SemWare, 730 Elk Cove Ct., Kennesaw, GA 30144.

After reading the August *Star-Dot-Star*, I would also recommend the program to Tom Swan ["Developer's Toolbox"] in lieu of his recommendation, the $195 *Brief*. I think he might find

(continues)

ANTHONY RUSSO

it an equally effective tool for programmers.

Robert M. Clark
Danville, California

The User's Best Friend

It's always nice to see a write-up of shareware in a major computer publication such as yours. However, the article failed to mention one of the best places to obtain shareware: the local user group.

Although the user-group library may be smaller than those of the commercial suppliers you mentioned, the advantages of obtaining shareware and public-domain programs from such a group include lower costs, a chance to talk with someone who has used the program, and local support services. User groups offer a lot to both novice and experienced users, and to everyone in between. Please don't ignore us just because we're small.

Richard Curry
President
Columbus Computer Society
Columbus, Ohio

Still Afraid of 1984

Although I am an avid PC user, I have always feared that the widespread use of computers would ultimately rob us of our ability to think. Your review of the AST Premium/386 [*The Hardware Shelf, PCW,* August 1988] has convinced me that my fears are well grounded.

Specifically, you state on page 135 that the AST I/O bus runs at 8 MHz, while the IBM PS/2 Model 80-111's runs at 10 MHz, thus giving the IBM a 20 percent edge.

Where did you guys go to junior high school?

A 20 percent improvement over an 8-MHz speed would be 9.6 MHz. In actuality, the 10-MHz IBM bus is 25 percent faster than the AST's. I realize that this is a small point, but it reflects a bigger problem.

Mark E. Bradley
Stoneham, Massachusetts

Good eye. That's what we get for doing all our figgerin' in hexadecimal. —Ed.

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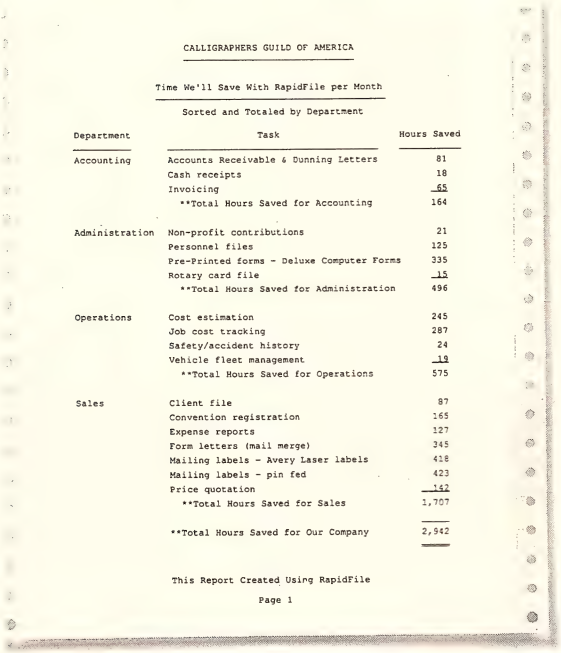

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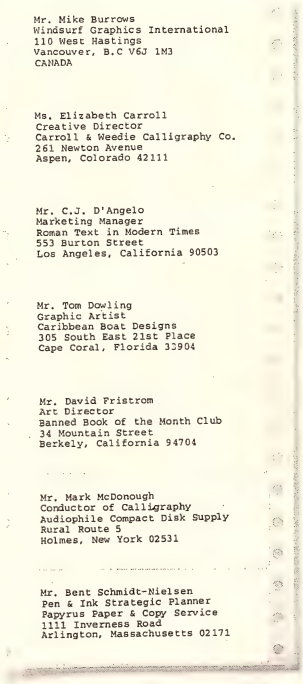

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Stuck With PagePerfect's Imperfections

I didn't listen: In spite of your admonitions ["PagePerfect," *PCW*, July 1988], I went out and bought a copy of IMSI's *PagePerfect*. It is the single worst program I have ever used—and I've used a lot of programs.

It is clumsy, slow, and so full of bugs that it crashes with unbelievable frequency; all data is lost and you are left at the DOS prompt with an indecipherable error message. And instead of downloading fonts to my LaserJet, it leaves them on disk, turning the printing of a single page into a 10-minute operation.

I've learned my lesson.

Harry I. Shuman, M.D.
Tampa, Florida

A Trustworthy Trinity

The August 1988 *Hardware Shelf* states that the Epson LQ-1050 is "possibly the perfect 24-pin dot matrix printer," but went on to criticize the "unreliable sheet feeder" and "occasional paper jams."

There are only three reliable objects in my life—my Toyota Camry, *WordPerfect*, and my Epson LQ-850 (the narrow carriage version of the LQ-1050). It is the perfect dot matrix printer, has a reliable sheet feeder, and rarely jams.

Leslie R. Morris
Niagara University, New York

.OBJectionable Review

Your review of Turbo Pascal 4.0 [*The Software Shelf*, *PCW*, August 1988] states incorrectly that the compiler is not yet compatible with Microsoft .OBJ-format files. Not only does Turbo Pascal 4.0's linker work well with .OBJ files, it can also handle *near* or *far* calls contained in those files. The compiler's manual does an excellent job of explaining how to link .OBJ files into programs.

Joseph E. Crouch
Balch Springs, Texas

In fact, Turbo Pascal's linker works well only with .OBJ files produced by assembly and C compilers. Other compilers don't follow Turbo Pascal's segment-naming conventions, and so their .OBJ files cannot be linked into Turbo Pascal programs. This important distinction was mistakenly edited out

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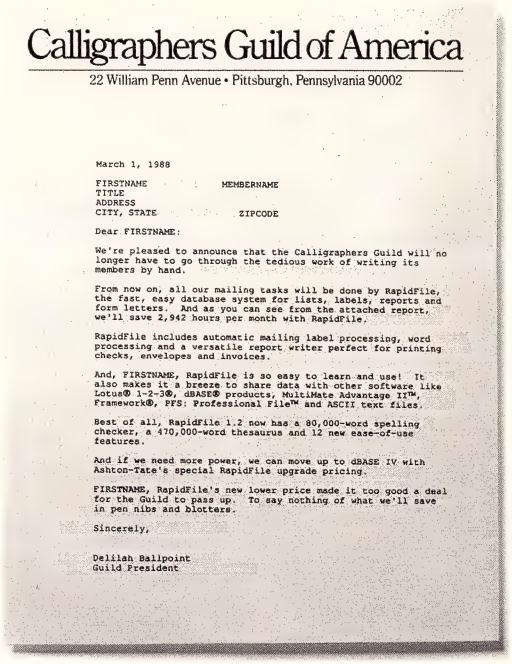
Rapid letters. Rapid File.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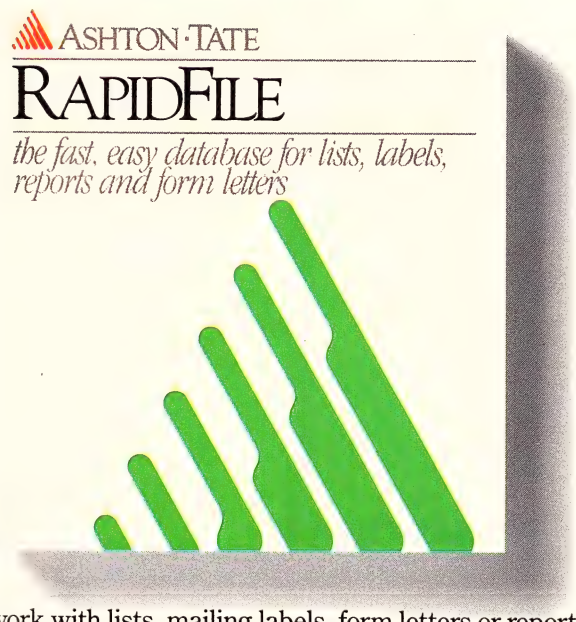
Guild President



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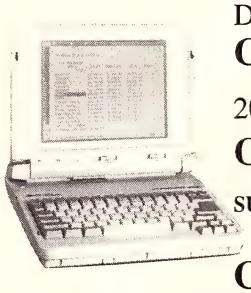

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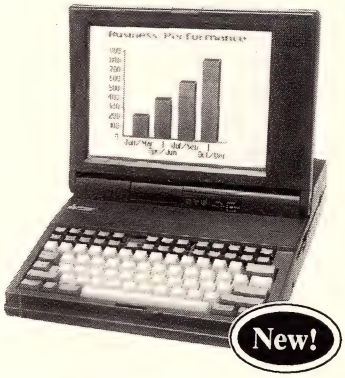

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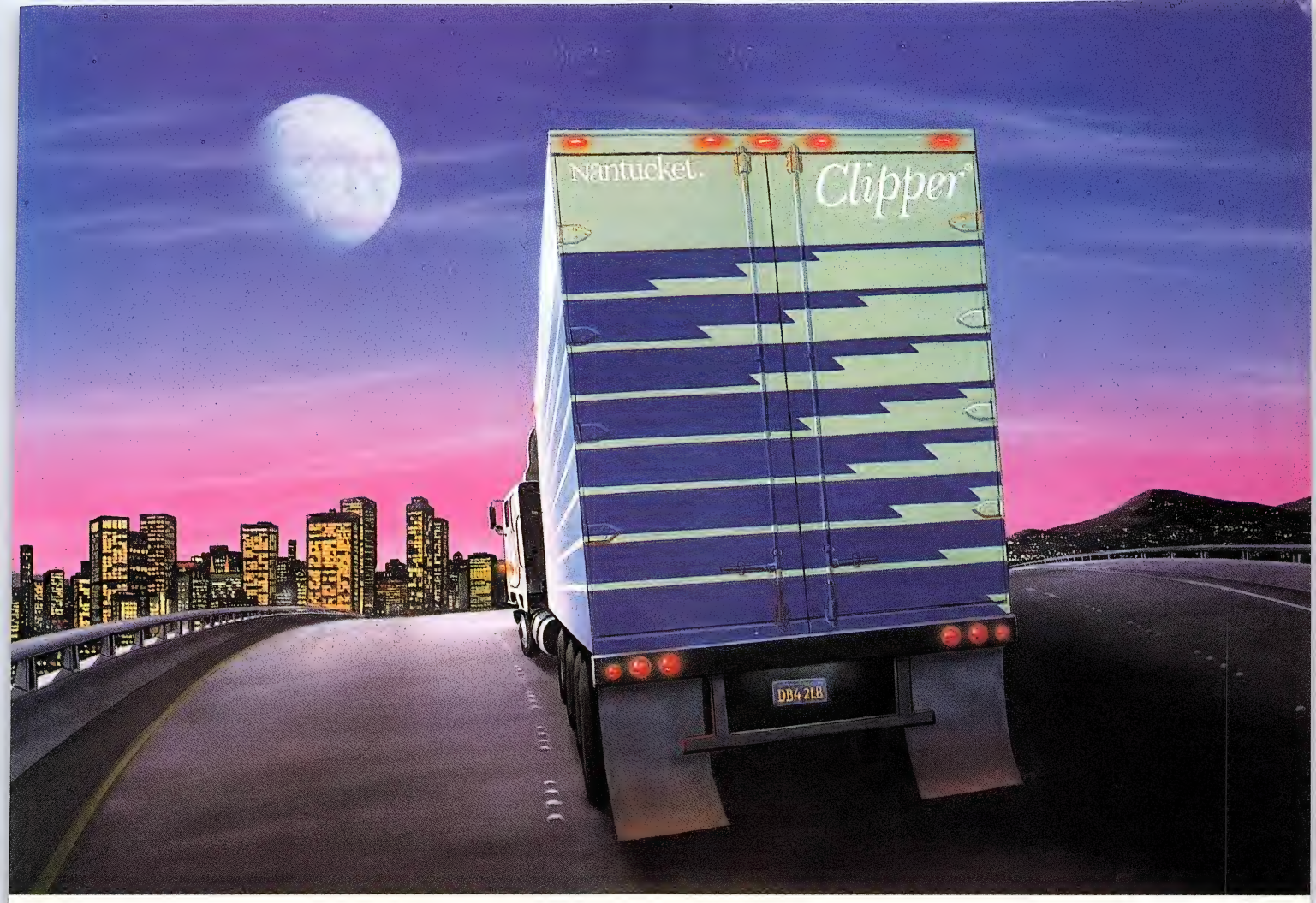

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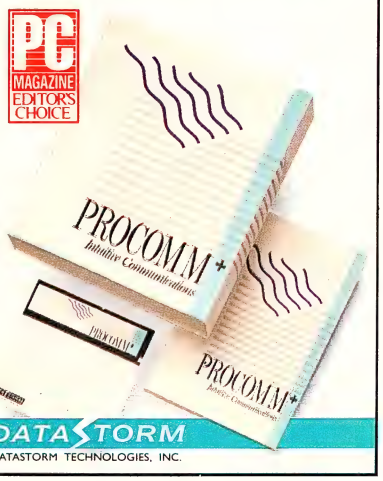

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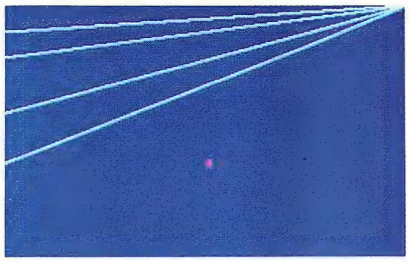
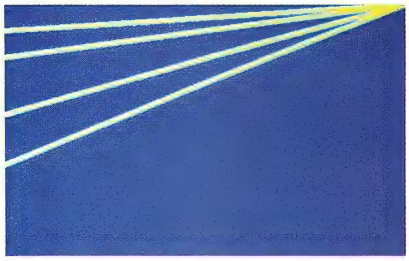


Polaroid Palette



Polaroid PalettePlus

of Michael Covington's manuscript, and we regret the error. —Ed.

Corrections

Those readers who aren't color blind may have noticed that our review of the Xtron MF147 monitor ("Viewers' Choice: 13 Monochrome Monitors," *PCW*, August 1988) contained an editing error; obviously, we reviewed the amber and not the paper-white version of the monitor. We also mistakenly reported that the unit was manufactured in Korea, when in fact it was manufactured in Taiwan. We apologize to Xtron for the mistakes.

Further, although Xtron claims that it does not ship a monitor with a 17-MHz bandwidth (a statement supported in MF147 documentation from several dealers), the author, TJ Byers, reports that a 17-MHz rating was printed in our review unit's documentation. In any case, we stand by the author's qualitative judgment of the monitor.

A review of the Polaroid PalettePlus (*The Hardware Shelf, PCW*, March 1988) stated unfairly that the PalettePlus offers "few discernible improvements in image quality" over the original Palette. The authors based their analysis on tests that failed to fully implement the PalettePlus's EGA capability, as shown in the comparative screens that accompanied the review. In fact, the PalettePlus offers improved resolution with programs that use the PalettePlus driver on EGA-equipped systems. The accompanying screens show a comparison of the same *35mm Express* file captured on the Palette and the PalettePlus. *PC World* regrets the error.

In our August 1988 review of five XT clones ("XTs for Bargain Hunters"), we mentioned that all the machines (except the Maxum Turbo XE) were equipped with an 85ms Seagate ST-225 hard drive. In fact, the ST-225 is rated at 65ms. We also said that all the machines have 135-watt power supplies; while that's true of the Maxum and the Plain Vanilla PC, the others come with 150-watt power supplies. *PC World* regrets these errors.

Last, the telephone number for Blackship Trading Company in the Where to Buy listing of August's "Business Class ATs" works only within California. Outside California you can reach Blackship at 415/952-7955.

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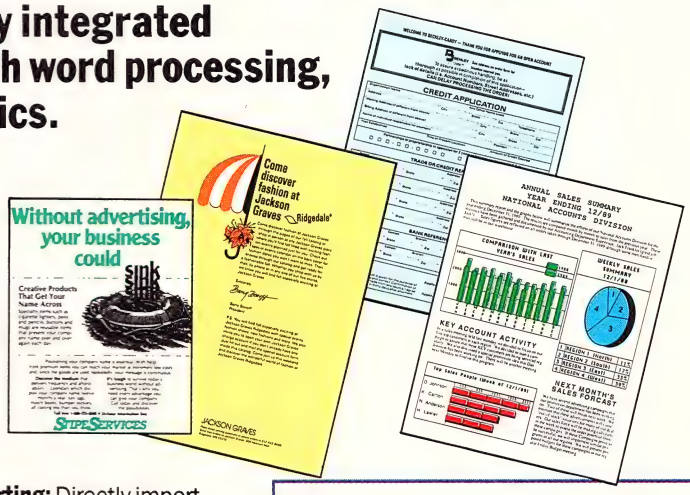

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'Til Death Do Us Part?

Has our relationship with software companies matured as much as our understanding and use of computers has?

Can this marriage be saved?

David Bunnell

FRED STIMSON

Three or four years ago, PC users everywhere were reluctant players in a drama called "The Copy Protection Snafu." By complaining loudly and refusing to buy copy-protected software, we won that round of the battle we're always fighting as consumers. After much travail and inventiveness on the part of users who figured out ways to break protection codes in any case, the companies caved in one by one, and most software sold today is not copy protected. Pardon me while I don my populist hat, but I think this is a great example of how users can band together to make change in an industry we've built into a major economic force.

For those ready to take up the cudgel again, I'd like to present another problem that needs our energy: getting better support and warranties for the software we buy. I think we need a uniform licensing code. Some software companies think they've been so magnanimous in hearing us out on copy protection that they need give no more. Their idea of a guarantee is to say, The disk is formatted, the manual has been proofed and printed, call us when you want to buy again. Microsoft is one of the few exceptions in that it guarantees satisfaction on all application software.

Don't you think that a program costing $400, $500, or $600 deserves a little more support from its seller—especially when the cost of the goods going into it is often less than $25? Sure, the ingenuity of the idea, the programming, and the marketing are worth a lot—but $500 a copy includes a healthy profit. Software licenses should represent an ongoing relationship between seller and buyer.

At the very least, we should have the satisfaction of a code spelling out certain elements we could always count on in buying software. This would include some mention of an ongoing upgrade plan. As it stands, we're ripped off all too often by buying what really amounts to a shrink-wrapped, beta-test version of a program. There are invariably bugs and missing features that the next couple of versions help remedy, but the overall effect of a company being first out of the gate is to penalize early buyers. And then we're stuck choosing between versions when we don't know what's coming next or when we'll see it.

A uniform code would also ensure that incremental upgrades would be sold for some fixed percentage of the original cost of

(continues)

the program. I think that 15 percent is a good guideline. Having a reasonable and predictable price for upgrades would give buyers more confidence in their purchasing plans, and vendors could count on steadier sales year in and year out. With releases as random as they are now, software companies spend more on promotion, and you'd better believe that we pay more as a result.

As for our responsibility in this committed relationship, we have to become more savvy consumers. We must know our rights, but we must also send in warranty cards and keep track of bugs, fixes, and price points that matter to us. We should let companies know when their advertising works and how they can market their products more effectively—even after the sale. What kind of technical support do we expect? Are the companies aware of that expectation?

I think that user groups and associations of user groups can lead the call for a code that will make our lives a little easier. We've lived long enough with PCs to know they're not a fad, remarkable though they may still be. They are tools we want and need to use in all kinds of work we do. We've made software companies successful by using their products in our machines. This relationship implies a responsibility on both parts. If we agree not to illegally copy or alter software, if we are willing to learn new programs and commands and even languages in order to work more effectively, then software companies can work to improve and support their products for our use. To paraphrase an old saying, what's good for business is good for users everywhere.

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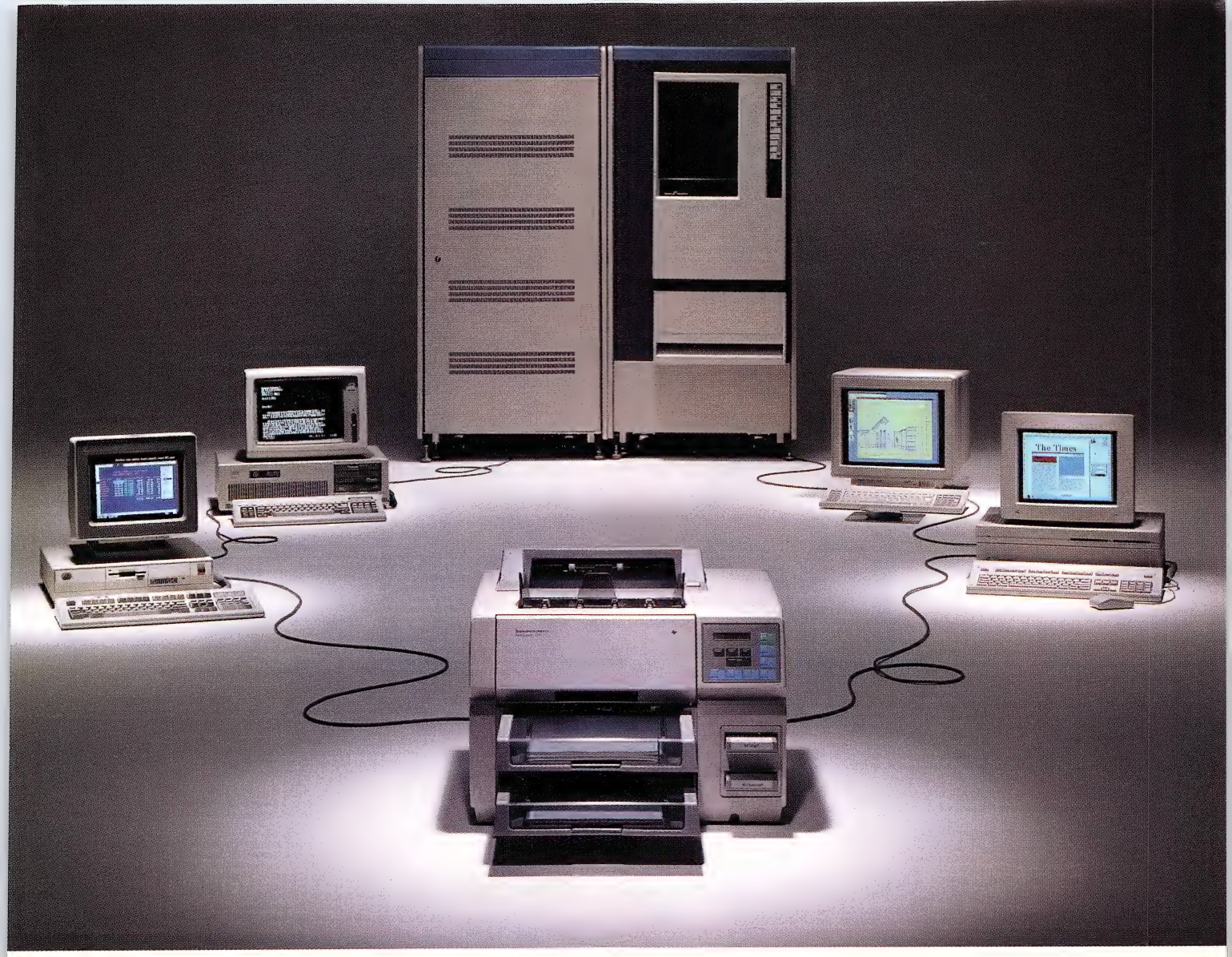

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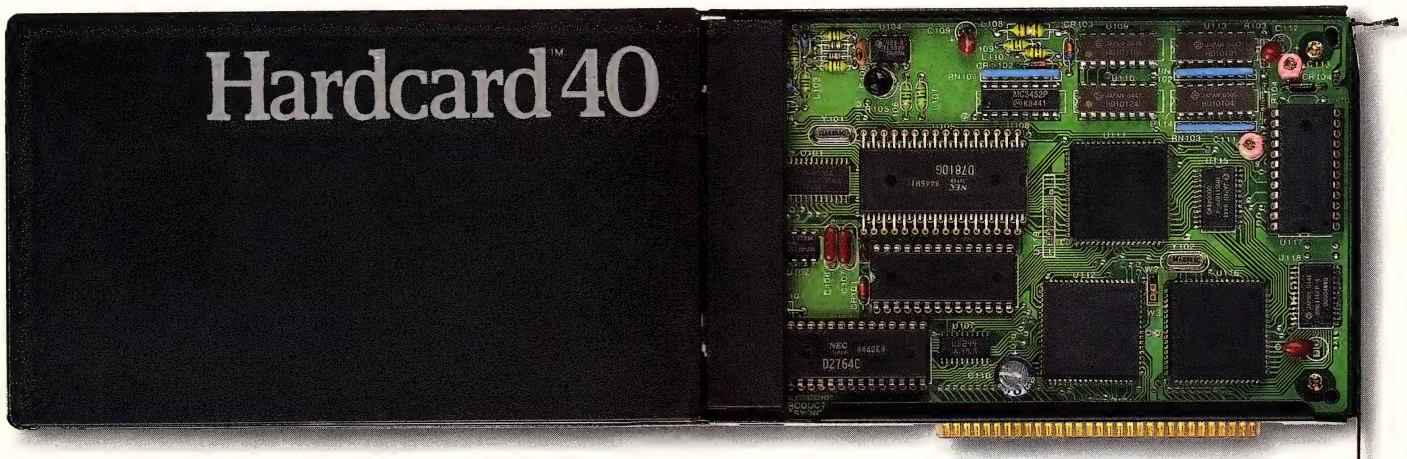

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Next in

PC WORLD

December

Hardware Buying Guide

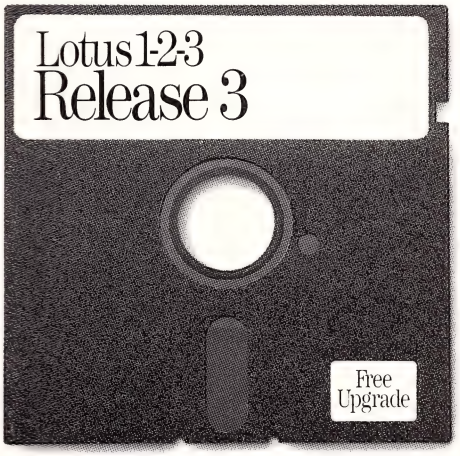
In the past year, we've seen a bonanza of new and challenging hardware technologies. Understanding when you need state-of-the-art equipment is the key to making intelligent choices. Buy smart, and it makes a difference in the way you work.

PC World's hardware extravaganza focuses on the latest and greatest offerings in the PC universe. Buyers' Guides survey PS/2 peripherals and high-powered 80386 systems, and our reviewers scrutinize 15 VGA monitors, 10 VGA boards, 7 20-MHz 386s, and 7 lightweight laptops. With the support of NSTL's performance benchmarks and compatibility tests, plus our Features Evaluations, we highlight the most important factors in your hardware buying decisions.

Who Likes the PS/2?

IBM sold the first generation of PS/2s—complete with Micro Channel Architecture—as the systems of the future. Well, the future is here, and even IBM's most loyal customers are wondering just what they bought.

Here's an offer only the most analytical minds in America can appreciate.



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Lotus 1-2-3

(1) Upgrade offer valid September 6, 1988 through 30 days after the 1-2-3 Release 3 ship date. (2) National Software Testing Laboratories, Inc. Software Digest Ratings Report, June, 1988.
(3) 1-2-3 system requirements will vary from Release 2.01 to Release 3. 1-2-3 Release 3 runs under DOS and OS/2. Hard disk and 640K required. Lotus certified compatible PC with 80286 processor or better recommended.
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- *Supertwist LCD display, 8 lines x 106 columns*
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The Cambridge Z88,

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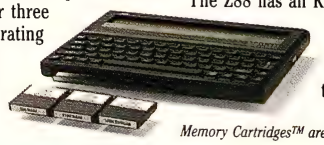

Memory

The Cambridge Z88's memory is expandable with replaceable solid state RAM and EPROM Memory Cartridges™ that fit into three easy to access slots under the keyboard. The EPROM cartridges retain their contents when removed from the Z88.

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	8220 IBM PC Link II	82.00	3.00	85.00	
	8230 Serial Cable 9M to 25F	25.00	3.00	28.00	
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				Illinois residents add 7% sales tax	
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A Perspective on the Presentation Manager

The graphic user interface tells a story about what manufacturers think of users. It's not a pretty picture.

Stewart Alsop

FRED STIMSON

Around the time you read this column, in late October or early November, you should be hearing quite a lot about the Presentation Manager. If it's not shipping, you'll be hearing the thud of blows as IBM and Microsoft get beat up in the press for promoting vaporware. If it is shipping (and my best guess, as I write this in late August, is that it will be), then you'll be hearing all the gurus and gods of the PC industry proclaiming the goodness or badness of this latest and greatest graphic user interface.

Earlier this year I realized that the graphic user interface (GUI) would ultimately become the battleground for computer systems manufacturers. So I spent some time sitting in front of the various GUIs competing for our attention, including Apple's Macintosh, Hewlett-Packard's *NewWave* extension of *Microsoft Windows*, Sun's Organizer interface for its 386i workstation, Sun and AT&T's Open Look interface for UNIX, IBM and Microsoft's Presentation Manager, Xerox's Viewpoint interface for its 6085 workstation, and Tandy's *DeskMate* interface for DOS. I have used a Macintosh regularly and *Windows* programs sporadically—in addition, of course, to all the DOS programs I know and love, each of which sports its own interface. So now I consider myself an expert observer (but not designer) of user interfaces. Here's the first thing I learned: Most of the so-called experts have never actually sat in front of the interfaces they are pontificating about. As a result, most of what they have to say about user interfaces is pure hogwash.

Perhaps a little history is in order. The researchers at Xerox PARC (Palo Alto Research Center, where much of the original research into user-interface design was completed in the early 1970s) determined that, since most people who use computers work in offices, it might be helpful to use graphic representations of office tools to represent computer tools. Thus was born the infamous "desktop metaphor," which contained such items as a wastebasket for clearing objects from the screen, filing cabinets to represent storage space, folders and books to represent groups of files and directories, and in- and out-boxes for receiving and sending electronic mail. Indeed, in the Xerox model (carried into its Viewpoint interface) there is no such thing as a software program (since it has no real-life equivalent); anything you do—like writing or drawing or filing—is simply part of the

(continues)

computer system. It took Apple to come up with the idea that software was a separate object on the desktop and that each program (and therefore each developer/publisher) should have its own icon and identity beyond that of the system.

Unfortunately, much of this basic notion of modeling computers on the real world in order to help the user has been lost, because the industry neglected to distinguish between graphics technology and a graphic interface. Graphics technology gives computers the ability to turn spots on the screen on and off and, by arranging these spots, to make graphic objects appear. (This technology is called bit mapping.) Instead of setting out to help the user, each developer focused on proving to the world that its machine was more "graphical" than anyone else's: Witness IBM's dramatic announcement of a machine with a palette of 256,000 colors that can actually display 256 of them in any one of 307,200 spots (or "pixels") on its best color monitor.

The net effect of this achievement (known by yet another user-friendly acronym, VGA) is to help your machine turn pixels rapidly on and off, giving you your graphic interface. Of course, you're restricted to eight-letter file names (plus a three-letter extension), and you're still required to understand the concepts of path names, AUTOEXEC files, and CONFIG.SYS files if you want to customize any of your applications. And VGA does absolutely nothing to help most users get more out of their machines; it just lets them do what they've been doing for the past four years with a lot more colors and a lot faster.

No one is going to say VGA isn't good enough just because the developer left out some icons and other metaphors. But let's not call this a graphic user interface. Instead, let's insist that IBM and Microsoft finish the job they started. For instance, when you see your first demonstration of the Presentation Manager, ask the rep: Why do I need to put brackets around the path name in OS/2? If this is a desktop,

(continues)

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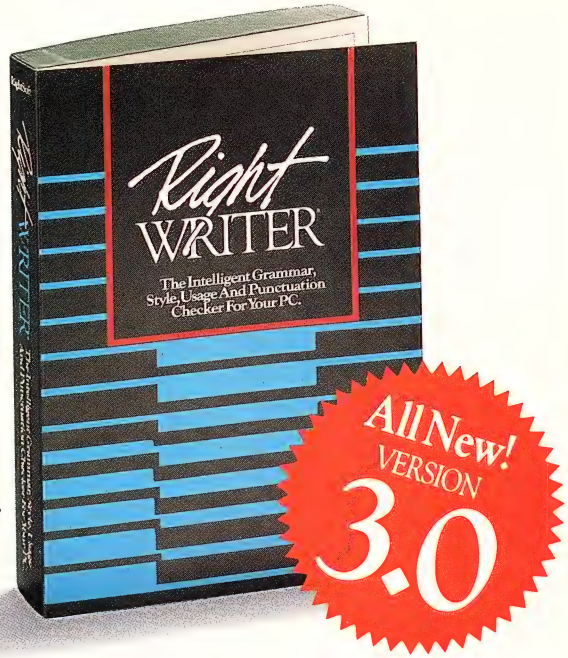

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```
There is a problem of a severe nature in widget production.  It is clear that
our current system will not cut the mustard.  We may possibly need to move on
this reasonably quickly.   To start, it would be advantageous to see if a new
design is doable.  (This should be looked into at once.
```

...RightWriter's Analysis

```
There is a problem of a severe nature in widget production.   It is clear that
  <<* U12. WORDY. REPLACE problem of a severe nature BY severe problem *>>
                  <<* S14. CONSIDER OMITTING: It is clear that *>>^
our current system will not cut the mustard.  We may possibly need to move on
      <<* S16. CLICHE: cut the mustard *>>^
        <<* U13. REDUNDANT. REPLACE may possibly BY may *>>^
this reasonably quickly.   To start, it would be advantageous to see if a new
                          ^<<* S17. WEAK: reasonably quickly *>>
  <<* S13. REPLACE advantageous BY SIMPLER helpful or good? *>>
design is doable.  (This should be looked into at once.
     <<* U16. NOT A WORD. REPLACE doable BY can be done *>>
                        ^<<* P11. IS THIS PARENTHESIS CLOSED? *>>
     <<* S1. PASSIVE VOICE: be looked *>>^

                         <<** SUMMARY **>>

     Overall critique for: C:\RIGHT30A\newtest.
     Output document name: C:\RIGHT30A\newtest.

READABILITY INDEX: 5.23

     14th      12th      10th      8th       6th       4th
      |****|****|****|****|****|****|****|****|    |
     COMPLEX             |-------GOOD--------|      SIMPLE
     Readers need a   5th grade level of education.

STRENGTH INDEX: 0.78

     0.0                       0.5                       1.0
      |****|****|****|****|****|****|****|**  |    |    |
     WEAK                                               STRONG
     The strength of delivery is good, but can be improved.

DESCRIPTIVE INDEX: 0.27

     0.2            0.5                       1.0       1.2
      |****|****|****|    |    |    |    |    |    |    |
    TERSE              NORMAL              OVER DESCRIPTIVE
    The use of adjectives and adverbs is in the normal range.

JARGON INDEX:  0.00

SENTENCE STRUCTURE RECOMMENDATIONS:
            2. Few compound sentences or subordinate
               clauses are being used.
           14. Many prepositional phrases are used.

                   << WORDS TO REVIEW >>
Review this list for negative words (N), jargon (J),
colloquial words (C), misused words (M), misspellings (?),
or words which your reader may not understand (?).
   ADVANTAGEOUS(J)  1                    DOABLE(J)  1
          NOT(N)  1                      SEVERE(N)  1
        WIDGET(?)  1
              << END OF WORDS TO REVIEW LIST >>
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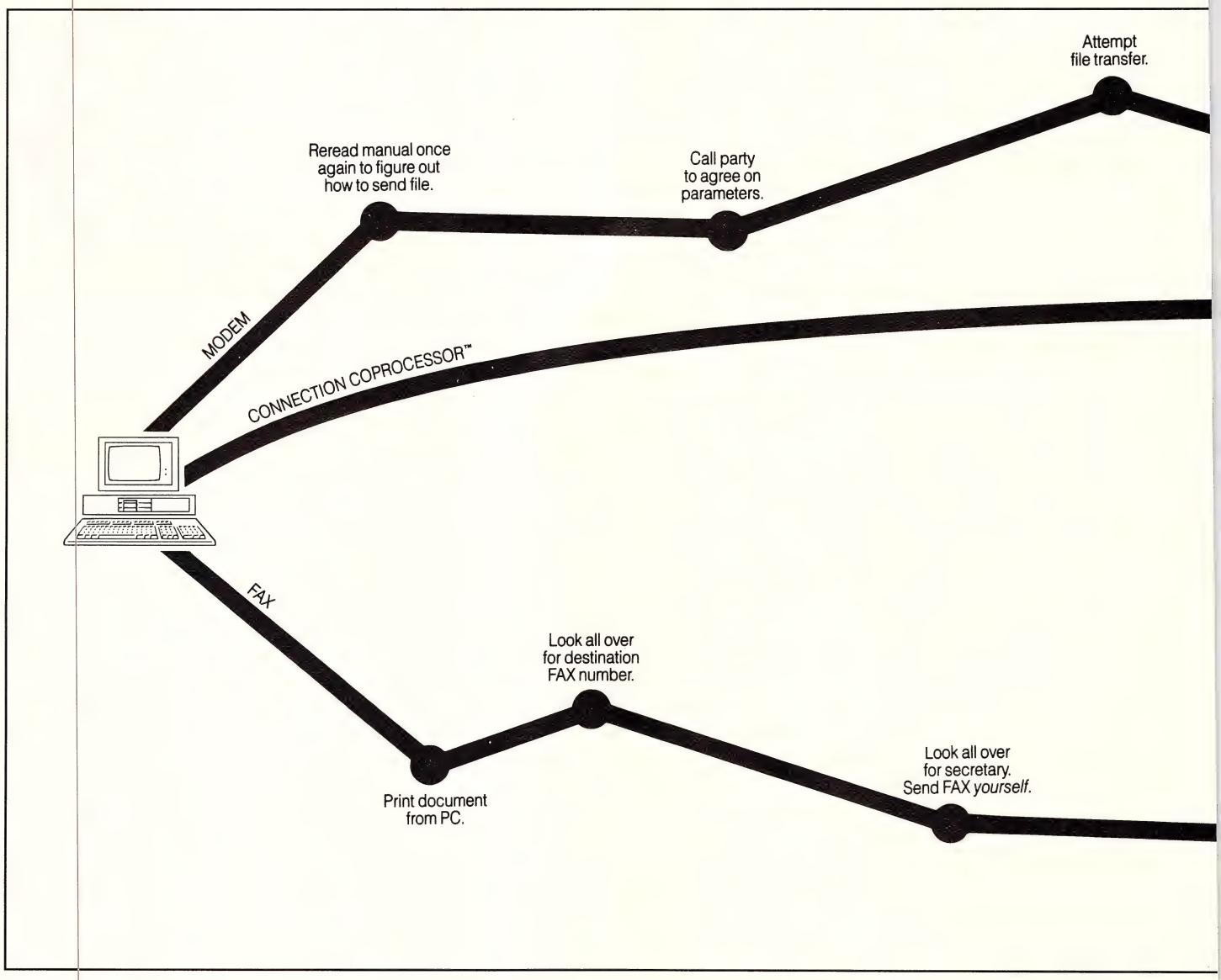

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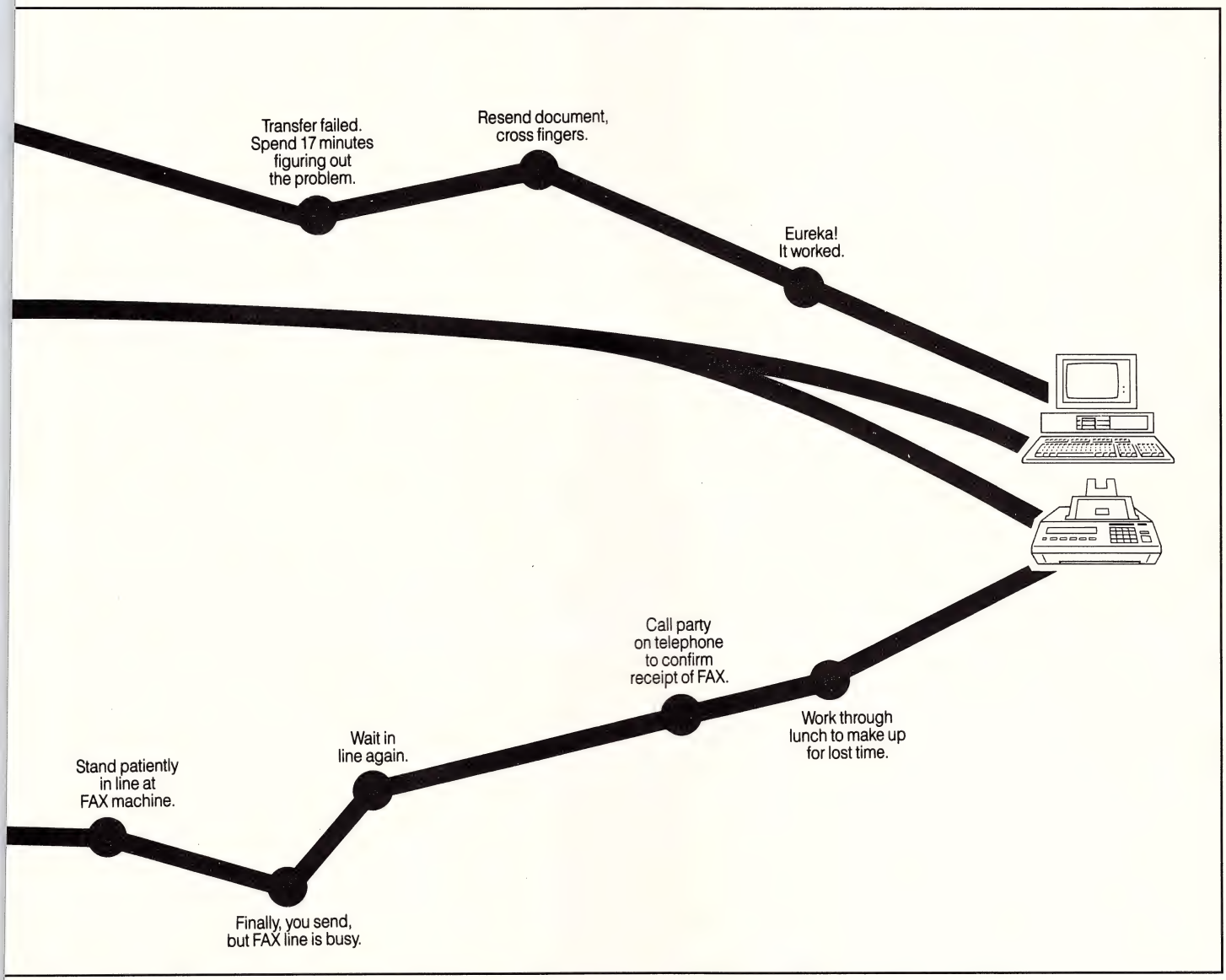
non-stop flights.



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where are my file folders? If this is a graphic interface, where are the icons to help me see the differences between different files? Why can't I label my files the way I label folders sitting on my desk? Where are the in- and out-boxes, the file drawers, and the trash can?

If people keep asking those kinds of questions, perhaps we will begin to see the kind of user-interface innovations presented in some of the more obscure interfaces that most of us will never see. For instance, Hewlett-Packard implemented an interesting notion called "compound documents" in its *NewWave* interface. This means that if you copy a portion of a drawing document into a word processing document, when you put your cursor into the drawing portion of the new document, the drawing software puts itself in memory and becomes available to you. So you don't have to remember where the software is or what it's called.

Another interesting innovation that is part and parcel of the Xerox interface is the belief that sending documents to another person should be as natural as (and a heck of a lot easier than) dropping them in an out-basket. That is literally how it's done: Click on the icon for an object, drag it over to the out-basket icon, and let go. If the system can't figure out who you're sending it to, it asks you for a name or an address. If the icon happens to be a printer or a facsimile machine, then the document gets translated to the appropriate format and sent.

The newest version of Tandy's *DeskMate* interface assumes that the system, not your application, should contain the ability to correct your spelling, wherever it is that you're spelling something—whether in a file name or a data base program or a spreadsheet. When technology is able to do that right, a logical extension will be for the system to also provide some advice on grammar and usage. Another idea, used first in *NewWave* and adopted recently by the Macintosh, is that the system should contain a macro recorder, giving you the ability to automate simple processes.

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(continues)

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Change column width without moving cursor	36	10	72
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Circle 216 on reader service card

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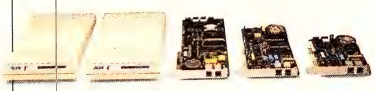

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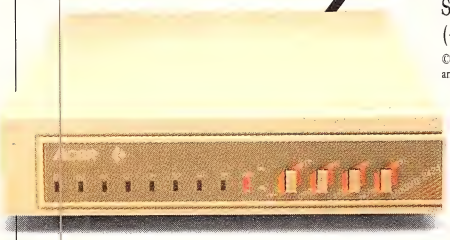

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PC WORLD
The Magazine for PC Decision-Makers

from four years of development for *Windows*, ask them why it took so long to put colored windows around the DOS file system. And then ask them how long it will take to get a real user interface, one that helps users become more effective and more comfortable with their computers instead of just making the programmer's life easier or organizing the printer interface. And when they deliver the user part of the Presentation Manager user interface, ask them whether other vendors aren't already a step ahead. ●

Stewart Alsop is editor and publisher of P.C. Letter *and a contributing editor for* PC World.

POWER TIP NO. 17

Quick Blocking With WordPerfect

You can quickly block sections of text, from the current cursor position, with *WordPerfect 4.2* and *5.0* by pressing <Alt>-<F4><Space> to block a word, <Alt>-<F4><Period> to block to the end of a sentence, or <Alt>-<F4><Enter> to block to the end of a paragraph. You can also press <Alt>-<F4> and type any character; if it's within the next 2000 characters, *WordPerfect* will block to it.

Karen Acerson, Orem, Utah

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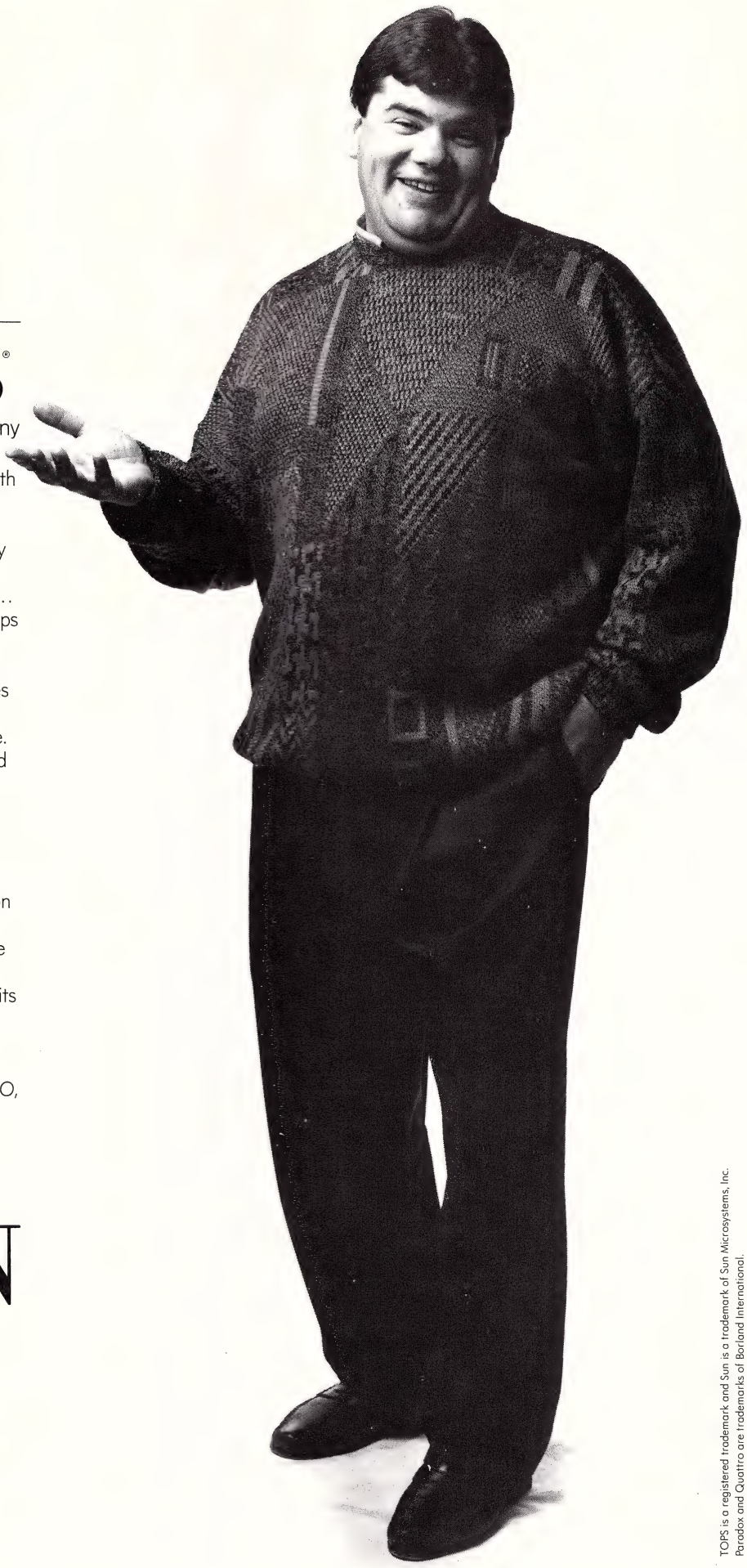

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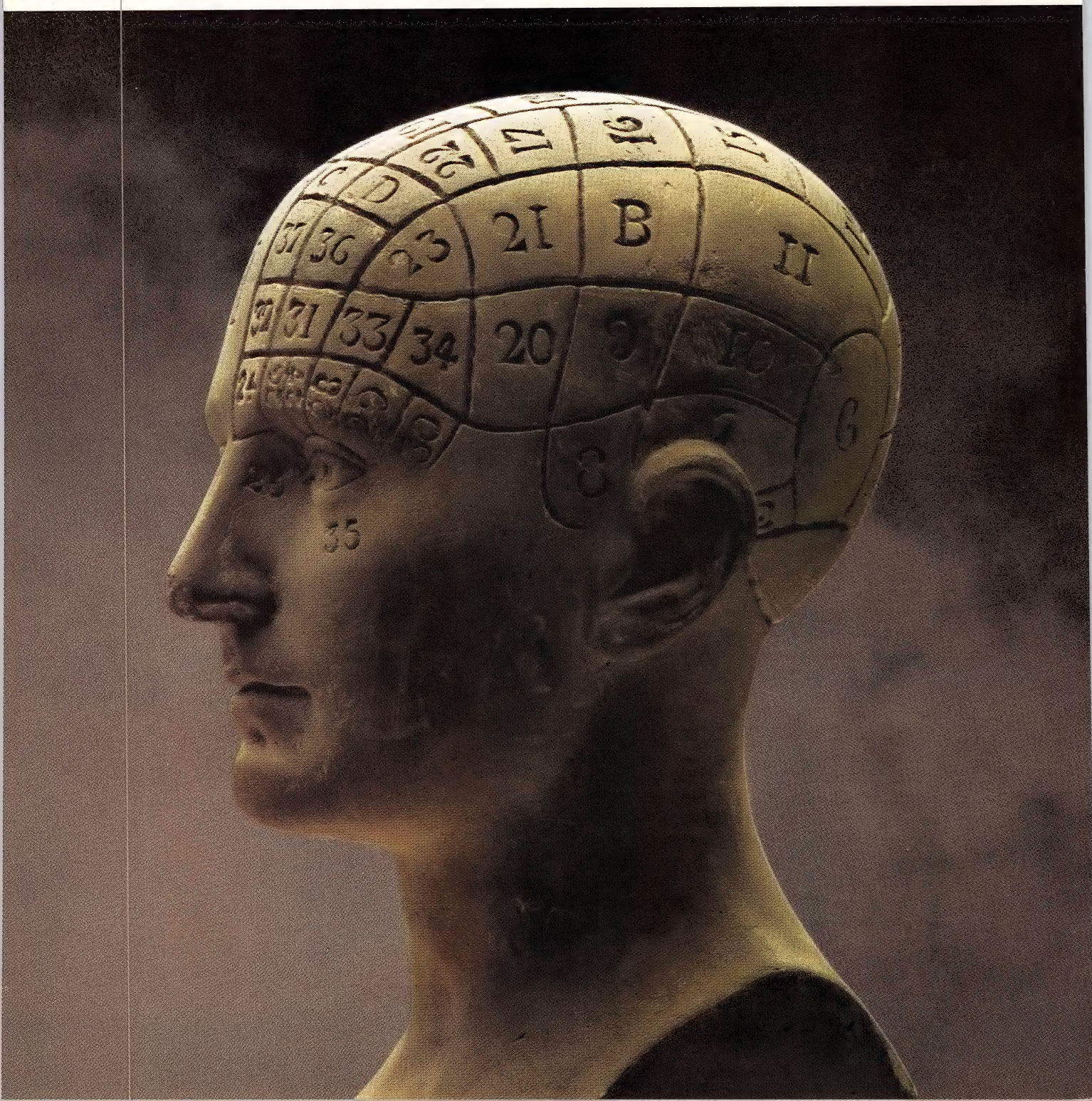

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New, Remove, Position, Assign, Discard, Undiscard

Scratchpad	Who	Issues
• Forward product comparison articles to Joan.	• Joan	• Competitive Tracking
♪ Can we get the cost of goods sold under $12?	• Tom	• Materials
• Bob will present ten-point incentives program at sales conference.	• Bob	• Bonus Dollars
• Tom will have his report in by a week from Friday; make sure it covers pricing, strategy, distribution, and implications of using outside vendor for typesetting and printing.	• Tom	• Distribution Vendors Pricing
• Decision needed on research budget by end of this week—discuss options with Jim and Joan.	• Jim Joan	• Research

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File: C:\AGENDA\FILES\ISSUES 06/21/88 11:00

Joan			
• Research	• Decision needed on research budget by end of this week—discuss options with Jim and Joan.	• High	• 06/25/88
• Competitive Tracking	• Forward product comparison articles to Joan.	• Low	• 07/07/88
Bob		**Priority**	**When**
• Distribution	• Do Tom and Bob think we need to adjust distribution mix?	• High	• 06/22/88
• Bonus Dollars	• Bob will present ten-point incentives program at sales conference.	• Medium	• 06/29/88

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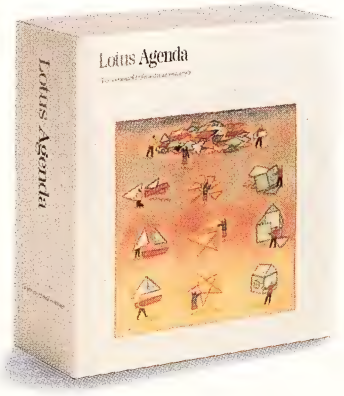

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Keys to IBM's Future Success

We are all taught to learn from our mistakes, but there is much that IBM can learn from its successes.

Simply put: Don't look back.

William F. Zachmann

MISSEY HARVEY

In times past, the name IBM was synonymous with the computer industry. IBM was the only game in town, and its identity was built solidly on technological sizzle and market leadership. But the giant has been slipping lately, and stooping to some pretty unappealing tactics to retain its leadership position: By insisting on building and promoting proprietary, closed systems, IBM is trying to recapture its glory days. It's a strategy that dooms IBM to remain mired in the past.

The proof, as they say, is in the pudding. In 1985 and 1986 IBM suffered its first two consecutive years of declining earnings per share since the Great Depression of the 1930s. Its modest increase in earnings in 1987 owes as much to higher foreign earnings from a weak dollar and to a lower tax rate at home as to any real improvement in results.

According to IBM's annual report, in the workstations revenue category (which primarily consists of personal computers, though it also includes terminals and whatnot), IBM actually had over a billion dollars *less* revenue in 1987 than in both 1985 and 1986. So despite IBM's self-proclaimed "success" with the PS/2, bottom-line results were so-so at best.

IBM's PS/2 Micro Channel Architecture (MCA) has turned out to be more a creation of advertising hype than of engineering excellence. More than a year and a half after its introduction, the MCA has yet to demonstrate any real advantages in either performance or function.

The fact is, IBM has a lot of problems that aren't going away. The dominant position that it has long held in the computer industry is fundamentally threatened. That is not, however, because personal computers are the source of IBM's largest revenues or biggest profits. Large mainframe systems hold that distinction. Rather, it is because the market for personal computers most directly displays IBM's deepest and most severe challenges for the 1990s.

Personal computers stand at the forefront of the transition away from the proprietary mainframe and minicomputer architectures of the past toward the increasingly standardized world of the future. The economics of the industry are shifting away from limited competition and semimonopolistic pricing. IBM, the most successful vendor in the old environment, must change

(continues)

drastically if it is to continue to be successful in the new.

IBM's response so far has largely been to try to roll back the changes that are revolutionizing the market. The PS/2, the MCA, OS/2 Extended Edition, and IBM's aggressive defense of "intellectual property rights" in patents and copyrights are all part of its effort to return to the proprietary architectures of the past—and to the control of the industry that proprietary architectures gave it. At the same time, IBM is trying hard to turn personal computers back into peripherals, albeit very smart peripherals, of the mainframe. The idea is to lock users in.

But it isn't going to work. The PS/2 and the MCA offer no real advantages over competitive offerings from other vendors. OS/2 Extended Edition is an overpriced underperformer that won't even run on most of the systems currently in use, including most of the PS/2s IBM has sold so far. Most users are much too smart to permit themselves to be led back into IBM's proprietary corral.

The sad part about all this is that IBM doesn't have to follow a regressive road in order to be successful. The key to IBM's future isn't in trying to turn back the progress of history and technology but in adopting strategies that will succeed in the new environment. IBM needs to take forward-looking action, as it did in the mid-1950s in response to Univac's early success with computers; or in 1964 with the introduction of its IBM System/360, a line of processors as consistently integrated for its time as the Digital VAX has become in the 1980s.

In fact, IBM has a tremendous initial advantage over competitors. Despite recent setbacks, IBM's reputation remains good. And most buyers are willing to pay more for a product from a company with a good reputation. Compaq, a mere whippersnapper in the industry, has built a reputation for quality that commands premium prices in the market. IBM can certainly do as well.

The problem, however, is that IBM seems to be preoccupied with finding ways to return to a more proprietary architecture instead of with finding ways to build a superior product at the best possible price. Obsessed with preserving the high mainframe profit margins that it has

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Actual unretouched screen images

A Clear View To Monitor Quality

come to expect, IBM is living in the past. That's no way to run a company in the 1990s.

A blatant example of this shortsightedness is IBM's approach to its excellent RISC-based RT computer system and UNIX. Appropriately packaged and priced, the RT would without a doubt be IBM's most competitive midrange offering, filling the role of both network server and departmental processor. Its speed and I/O capabilities would make it a natural winner in such a role.

Instead, IBM promotes the RT simply as an expensive, high-end workstation for scientific and engineering applications. Even though the new models last summer improved on the RT's so-so floating-point performance, the RT is really best suited as a general-purpose business processor. For departmental and file server applications, it could be highly competitive with less powerful Intel 386 and Motorola 68030 systems from other vendors.

IBM has so far been unwilling to aggressively position the RT for the markets where it has the greatest potential. The company is too concerned with promoting the less suitable but more proprietary 9370 (for larger organizations) or the AS/400 (for small and medium-size businesses) to let the RT fulfill its potential. IBM is still reluctant to admit that the UNIX-based operating system of the RT, AIX, is relevant outside the narrow world of technical computing (and government contracts that require it).

An analogous shortsightedness occurred with local area networks. If IBM had embraced and supported Ethernet as a standard in 1981 when it was introduced by Intel, DEC, and Xerox, IBM would dominate the local area network market today. An IBM ethernet would have achieved a much larger market share than has the IBM Token-Ring. IBM's insistence on doing it differently confused and thereby retarded the market, ultimately diminishing IBM's influence on local area networks in general.

Repeating mistakes like that is not the way for IBM to maximize its prospects for success in the new era of information systems. IBM ought to take a leadership position supporting standards; it ought to further reduce corporate overhead to become

(continues)

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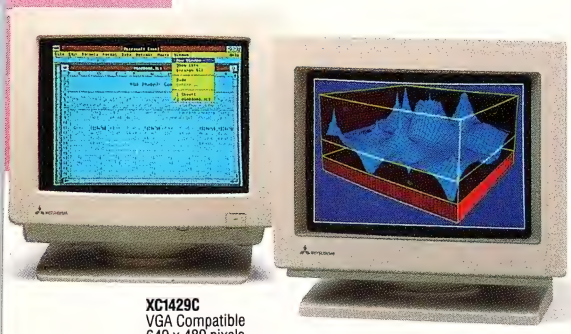

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Diamond Scan 16L* (HL6605TK)	16/15V	30 ~ 64 auto-tracking	0.31				•	•	•	•	•
Diamond Scan 20A (HA3905ADK)	20/19V	15.7 ~ 36 auto-tracking	0.31		•	•	•	•	•		
Diamond Scan 20L* (HL6905TK)	20/19V	30 ~ 64 auto-tracking	0.31				•	•	•	•	•
XC1429C	14/13V	31.5	0.28				•				
XC1410C	14/13V	22 or 15.75	0.40		•	•					
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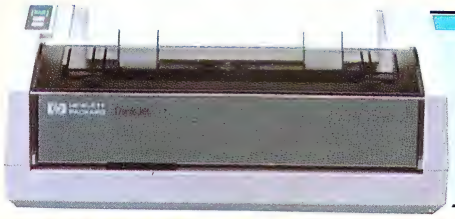

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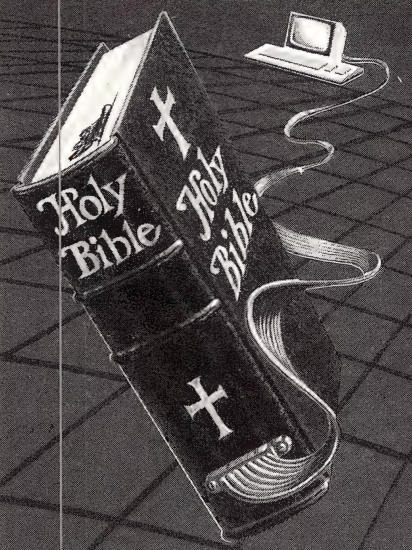

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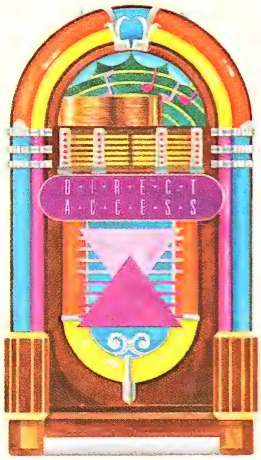

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truly price competitive; and it ought to concentrate on building the best possible products instead of finding ways to build more proprietary products. If it does all these things, IBM will continue to play the dominant role it has long enjoyed in the industry. If it does not, IBM will join the buggy-whip manufacturers and the railroads as a monument to the failure of keeping up with change.

William F. Zachmann is senior vice president at International Data Corporation.

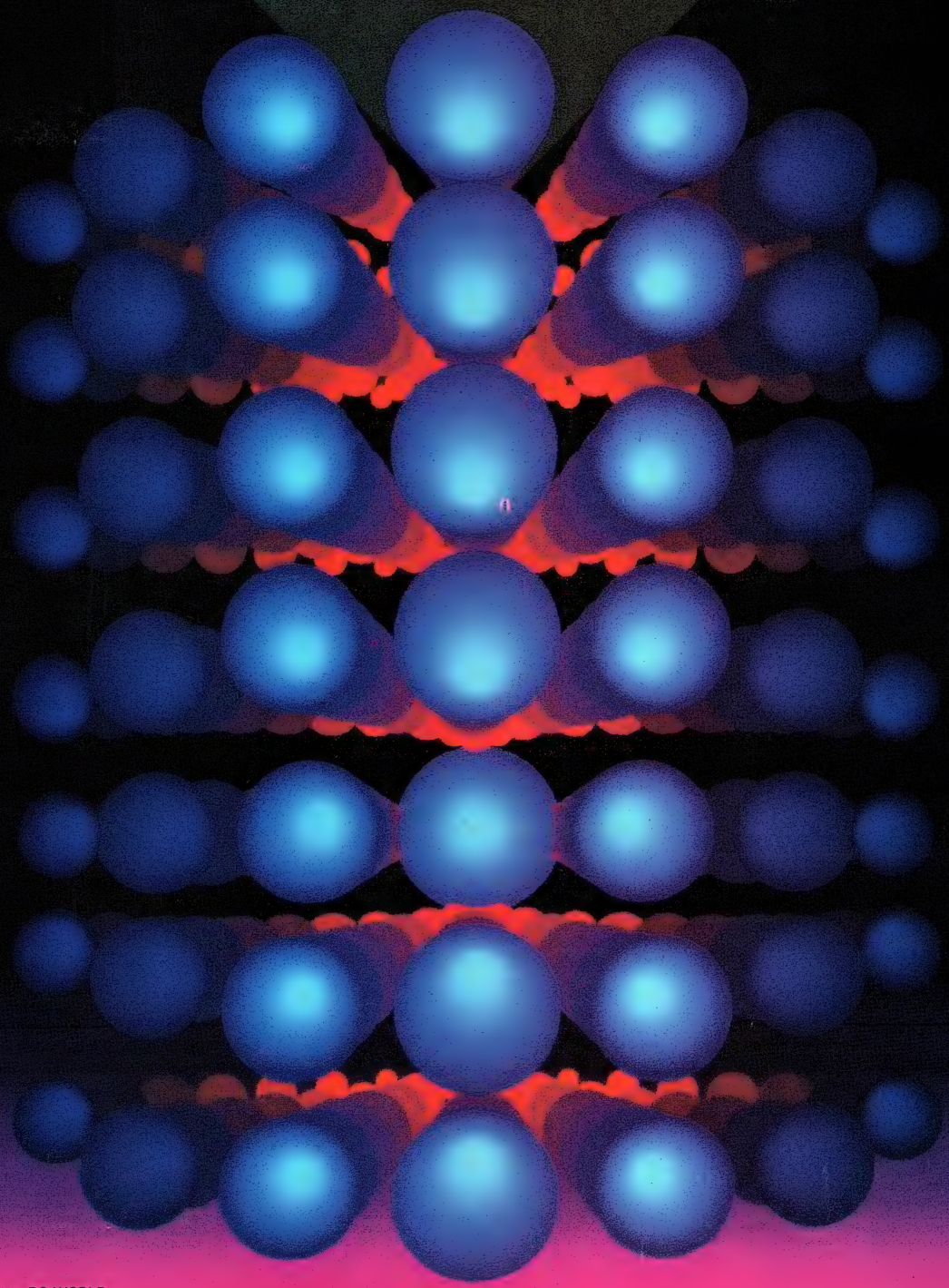
POWER TIP NO. 18

Use Backspace to List 1-2-3 Directories

Have you ever selected File Retrieve in 1-2-3 release 2 and then realized that the file you're looking for isn't in the current directory? To change directories you could type in the path name for the file or use the File Directory command. Instead, try pressing <Backspace>. This lists all the subdirectories and .WK1 files in the current directory and may enable you to find the file you want quickly. In fact, each time you press <Backspace>, 1-2-3 will display subdirectories and .WK1 files in each directory all the way back along the path to the root directory.

Thomas Oniguchi
Santa Clara, California

Database Management Systems: The key to the future of computing.



Advertising Supplement to PC WORLD

A strategy for the next generation of computing.

Information management in corporations is changing. In contrast to the historical mainframe and minicomputer emphasis, micros are becoming the focal point for future computing systems. The PC has given end-users a low-cost, easy to use data management solution that provides power and control over the user's data. Sophisticated applications have enabled the PC to be used as a key data management tool for individuals.

High volume data storage, retrieval capabilities, and limited end-user interactivity make mini and mainframe computers more suitable for production-oriented tasks. Display intensive applications required for interactive personal management have been best addressed by individual PC workstations.

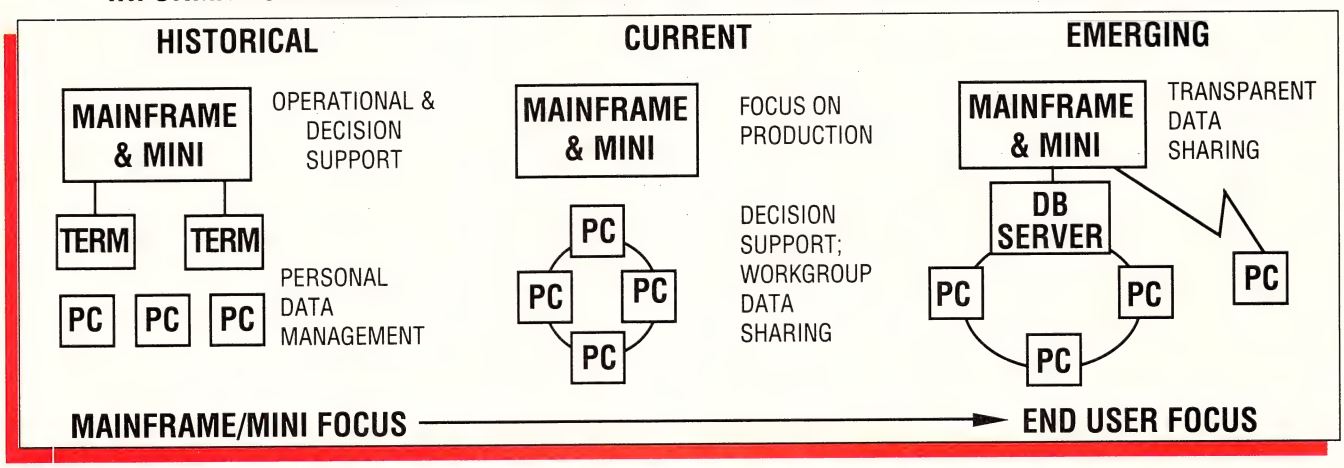
As individual PCs become more prominent business productivity tools, sharing a common data pool within a workgroup of individual PCs has emerged as a new user need. Driven by the user's interest in increased productivity while working from a familiar PC application, workgroup computing has become a natural extension of the user's individual PC environment.

The need to share data extends even beyond the workgroup to the corporate database on mainframes and minis. Users are demanding transparent access to corporate data residing in many different database types across multiple platforms while still retaining the highly productive personal data management solution at the workstation.

Central to these trends is the database management system. It is emerging as the key foundation of all information processing and the pivotal integrator for meeting users' and corporations' information management needs.

Just as the microcomputer is the focal point for future computing, the database will be the central repository of all information. And as the leader in microcomputer DBMS technology, Ashton-Tate provides the ideal end user solution for today's needs with dBASE IV™ and the dBASE/SQL language. This solution is the foundation for the integrated office of the future.

INFORMATION MANAGEMENT SYSTEMS ARE EVOLVING TOWARD AN END USER FOCUS



The solution.

Ashton-Tate provides the most comprehensive database solution for meeting the needs of all users from the first-time user to the professional developer. Working at an individual PC workstation, in a workgroup or accessing corporate databases, dBASE IV provides a clear migration path toward the integrated office of the future.

The Ashton-Tate® database solution is based on the concept that users want to work from a set of highly integrated and usable database tools — regardless of their location, operating system or database type. They require the flexibility to access many different databases across key operating system platforms. And want that access to be both immediate and transparent.

ASHTON-TATE®

The design of dBASE IV takes into account the changing structure of the workplace.

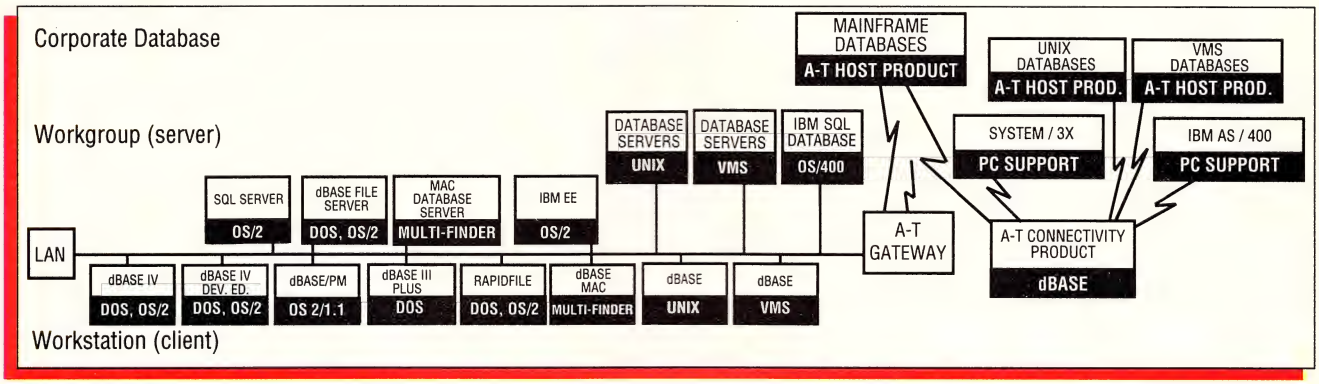
It is the ideal PC database from which users can share data in a workgroup and transparently access corporate data when combined with the Ashton-Tate/Microsoft SQL Server and Ashton-Tate connectivity solutions. MIS maintains control of the data while the individual gains greater usage and flexibility in their familiar PC environment.

Ashton-Tate's database solution provides businesses with the assurance that they can leverage their application and database investments. Businesses want the best and most cost-efficient platform for the application while keeping training and support costs for end users to a minimum.

The foundation.

With dBASE IV, Ashton-Tate has created a foundation for your future business data management needs. dBASE products are the standard and the preferred workstation solution in application development and personal data management. dBASE IV and SQL Server in combination provide the ideal next generation client/server workgroup computing environment. Users will have the flexibility of accessing many different types of databases both in the LAN server environment and remote hosts via intelligent micro- and server-to-mini/mainframe links.

The foundation for this solution is the dBASE/SQL language. It is the only language that combines the comprehensive application environment of dBASE software with the common data access language of SQL as a key foundation component for your connectivity solution.



USER ENVIRONMENT	SOLUTION	BENEFITS
Workstation	dBASE products are the standard in micro application development and personal data management. Versions will be provided for DOS, OS/2, Macintosh, UNIX and VMS providing comprehensive coverage with leadership in usability and productivity.	Superior interface and tools for application development and interactive productivity that is 100% compatible across operating system platforms to leverage your data and application investment.
Workgroup	Leadership in next generation database server solutions with the flexibility of accessing heterogeneous (different) back-end servers across OS/2, Macintosh, UNIX and VMS operating systems. Continued leadership in file server solutions for low cost, easy to use multi-user requirements for DOS and OS/2.	Highest performance and compatible solution with dBASE IV as the front-end and SQL Server as the back-end. Ability to utilize the best back-end server to optimize application processing.
Heterogeneous Mini/MF Connectivity	Access to heterogeneous (different) database types on mini and mainframes from dBASE for retrieval and optional updating across a wide range of operating systems.	Transparent access to your corporate data from a consistent and familiar dBASE interface to most effectively utilize your corporate database investment.

The driving force.

With more than two million end-users of dBASE products and tens of thousands of third-party applications written in the dBASE® language, dBASE products are the standard by which all other products are measured...and written to. And with dBASE IV, Ashton-Tate continues to challenge itself to reach a new standard of functionality and integration in the business environment.

The next step.

Now, with dBASE IV and dBASE/SQL, Ashton-Tate provides the next generation database management system foundation for end-users.

A look at dBASE IV:
You mean it's this easy to do all this?

You look to database software to organize, coordinate and add some discipline to your job performance. You expect it to miraculously transform your inventory or sales information into an intelligent pathway for business direction. You expect it to be easy. Then, you sit down to try to use it. And what you find is often somewhat less than inspiring...and just plain too hard to get it to do what you want it to do.

Ashton-Tate based their product development on feedback from users. dBASE IV's completely new, intuitive user interface — the Control Center — allows you to perform tasks with simple to use pull-down menus and logical task-oriented tools - all without delving into the more complex function of programming.

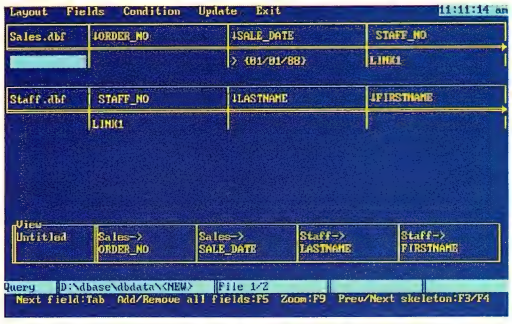
As a first-time user of a database management system or as someone who breaks into a cold sweat when the word "programming" is mentioned, you gain access to the sophisticated organization and retrieval of information that used to be left to someone else to provide for you. You'll be off to a fast start with dBASE IV's on-disk tutorial. And context-sensitive, on-line HELP is available to answer all your questions.

Query-By-Example (QBE)

Query-By-Example makes it easy to extract, view and manipulate selected records from a database. You specify the record selection criteria by entering simple phrases in the query design screen. Or, you can use pull-down menus for even greater ease of use. With QBE, you can extract data from several files simultaneously, in a single operation. No knowledge of the dBASE/SQL programming language is needed.

Problem:
You just completed a record-breaking sales quarter. You need a report that combines several criteria in the same file to show all sales over $20,000 within California during the past 3 months.

Solution:
Select "create" under Query in the Control Center and use the pull down menus to select the database files you need. With the QBE screen in front of you, go to the sales field and type in "> 20000". Then go to the state field and type "CA", and then to the date field and type "> {01/01/88}". Hit the DATA key (F2) to see your results.



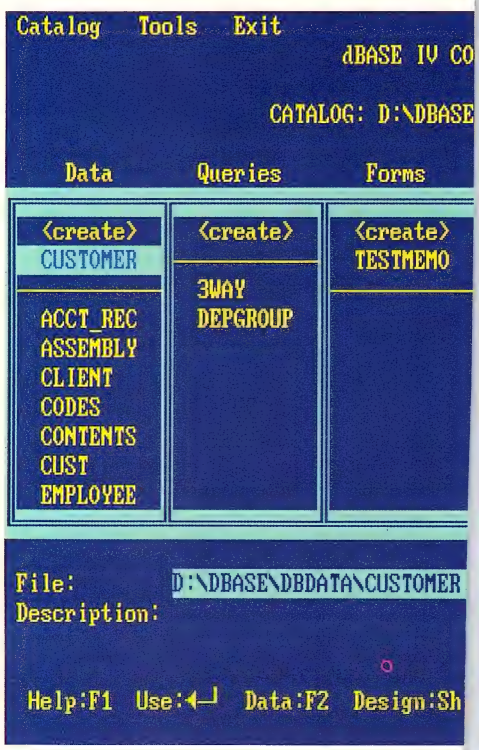
Forms Manager

Using a full screen work surface, you can lay out full-color forms for data entry, modification or viewing. It's as quick and easy as drawing them on paper. When specifying data entry forms, you can take advantage of dBASE IV's enhanced data entry capabilities to reduce data entry time and errors. Once you specify a form, dBASE code is automatically generated to describe it. You can recall forms for later use, quickly modify them with the new editor and include them in turn-key applications.

Problem:
You just finalized the major account contracts for the next year and you want to set up a customized form to update progress against annual and quarterly goals.

Solution:
Select "create" under Forms and use the Quick Layout feature of the forms manager. All the fields are immediately placed on the screen. Lay out the form with the box and line drawing capabilities and block copying and moving. With a few keystrokes, add color codes and set up multiple choice options for each question. This saves time and reduces margin for error because all you need to do is hit the spacebar or first letter of the answer when filling in the form.

From a single screen, the Control Center gives you control of all the powerful facilities of dBASE IV: File Creation, Query-by-Example, Forms Manager, Report Writer, Label Writer and Application Generator to the level that you need. This next generation user-interface lets you accomplish your data management tasks quickly, whatever your experience level.



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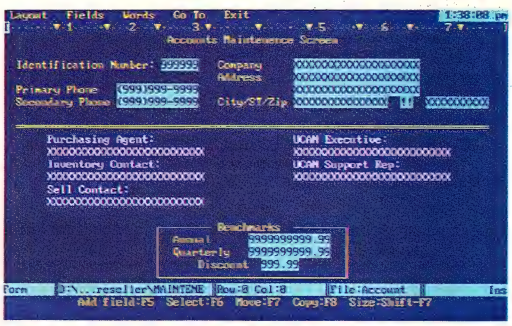
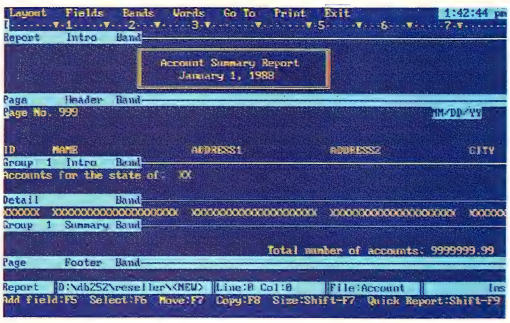


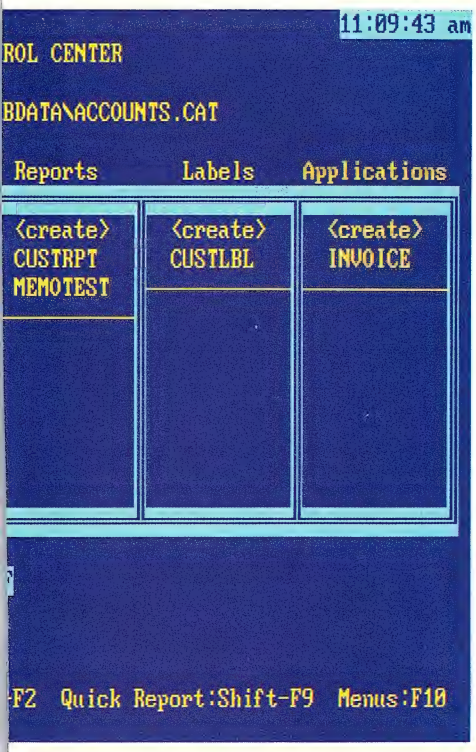


Report Writer

Whether you're generating simple columnar reports, filling in pre-printed forms or producing mail merge documents, laying out a report format is a snap with the dBASE IV Report Writer. Using a full screen work surface, you can lay out report formats. Repeating information, such as page headers, is easy to handle and you can take full advantage of your printer's special features such as underlining and boldface text.

Problem:
You need to quickly summarize accounts by state, with subtotals, for the Executive Committee meeting.

Solution:
Enter the dBASE IV Report Writer and select the Quick Column Layout. In the page header band, type in the title of the report and draw a box around it. The fields are already laid out. For subtotals, select ADD A GROUP BAND from the pull-down menu. Move to the summary band and type "Total number of accounts" and add a summary field.The report is complete and ready to print.

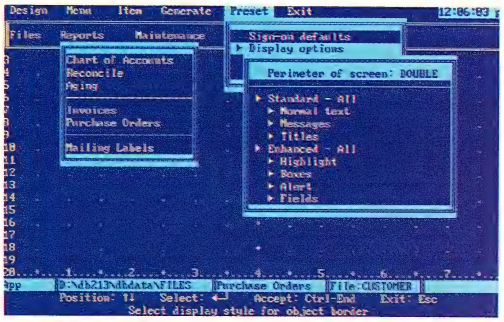


dBASE IV Applications Generator

Once you've created the files, forms, queries, reports and labels you require, you can use the dBASE IV Applications Generator to tie them together into a turn-key application. You can add sign-on banners, pull-down or pop-up menus with the powerful menu editor. The Applications Generator writes menus with the powerful menu editor and writes all the necessary dBASE code for you. To get your job done even faster, the "Quick Application" facility provides default application designs so you can develop complete applications in minutes.

Problem:
You've been asked to create a system to track the top 25 accounts based on a special database, form and reports that you've already created, and it has to be done before Monday.

Solution:
Enter the Applications Generator and create a menu which lists the different types of reports. Assign the proper report to each option and select the "Generate" option which generates the application for you. Immediately, you have a cohesive application which includes your file, form and reports, and you can still enjoy the weekend.



A look at dBASE IV:
How far can you take this much power?

You're the one who people come to looking for answers. The last person in your position didn't have them. You've developed turn-key applications using dBASE III PLUS™. You know it's easy to create, access and update data files such as mailing lists, personnel directories or sales contacts.

You've been working with dBASE III PLUS for some time now. You tinker with other application development languages. But you find that more and more of the requests you receive for program development are all focused on data manipulation and analysis. dBASE III PLUS works great, but there's got to be more. You want an environment that allows you to develop, test and distribute database applications quickly and productively. You want more speed, fewer bugs and easier editing. You want a bigger slice of the pie with royalty-free application distribution. You want an enhanced package for data management development from Ashton-Tate.

Problem is, it's still not enough. You're at the point of looking for short cuts, time-savers and more efficient ways to create more sophisticated files. You know how to build programming code. You just have more important things to do. Like designing all those applications everybody keeps asking for.

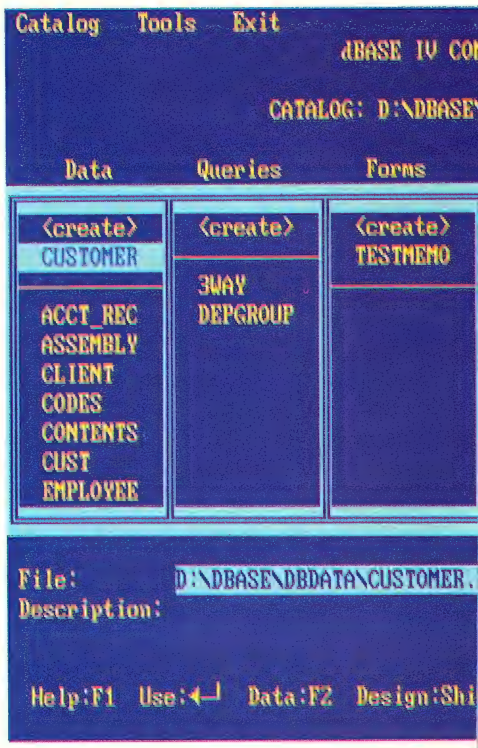
Now, because of dBASE IV's powerful relational capabilities, you can do all those things. You can set up data management systems that involve interaction between interdependent files such as sales orders, customer data, inventory and billing. You can build networking answers with various combinations of dBASE IV, dBASE IV LAN Pack and Ashton-Tate/Microsoft SQL Server to achieve the right workgroup solution. And most importantly, you can still accomplish all these tasks without writing any programs.

And when you want to customize a program further with embedded code of your own, you can rest assured that your old familiar dot prompt is still there, supported by a built-in automatic compiler that performs significantly faster than dBASE III PLUS. And naturally, programs you already created with dBASE III PLUS will run transparently.

dBASE IV significantly increases the capabilities of the already powerful dBASE III PLUS programming language. It adds 310 new or enhanced commands to this foundation including new, powerful user-defined functions, enhanced data entry capabilities, new window and menu features, multi-dimensional arrays and high precision financial, numerical and statistical functions.

dBASE IV offers a full implementation of IBM's SAA compatible Structured Query Language, the advanced relational database language rapidly emerging as the corporate standard for data access. SQL's set-orientation allows the user to perform complex relational operations with a single command.

And if you are a database applications developer, dBASE IV's Developer's Edition offers a complete database application, test and distribution environment that meets all your requirements.



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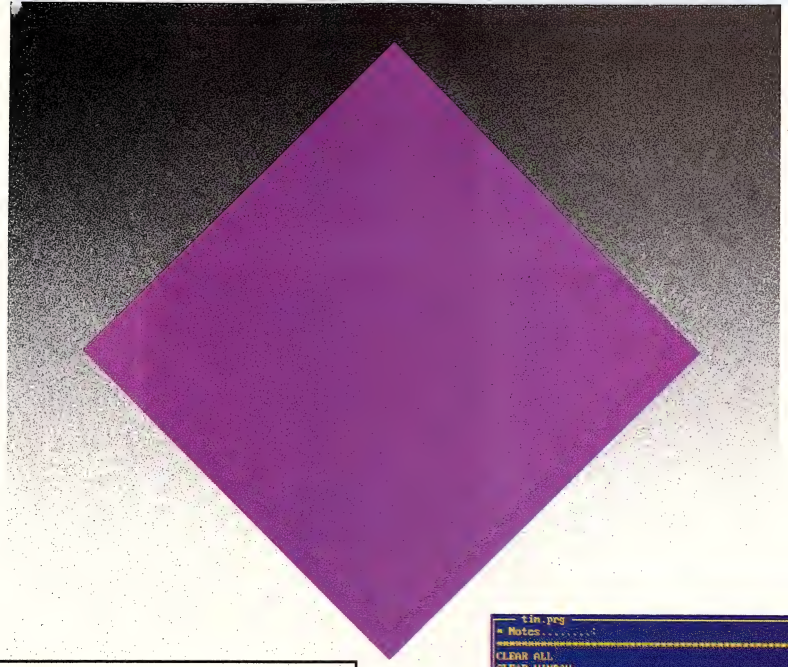
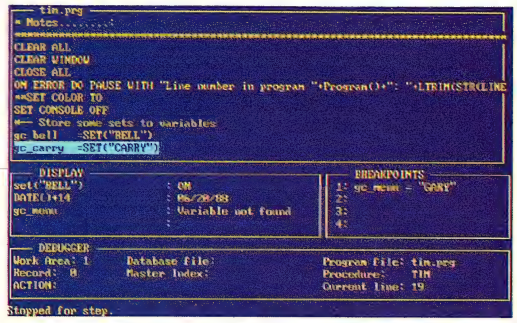


Advanced Debugger:
The advanced program debugger operates with multiple windows. Because it works closely with the built-in editor, which runs in one of the windows, the user can quickly edit and change programs interactively as error conditions occur. And, the fixes can be permanently saved.

Problem:
You've written a very sophisticated program with many different modules and a large number of variables and the results are not correct.

Solution:

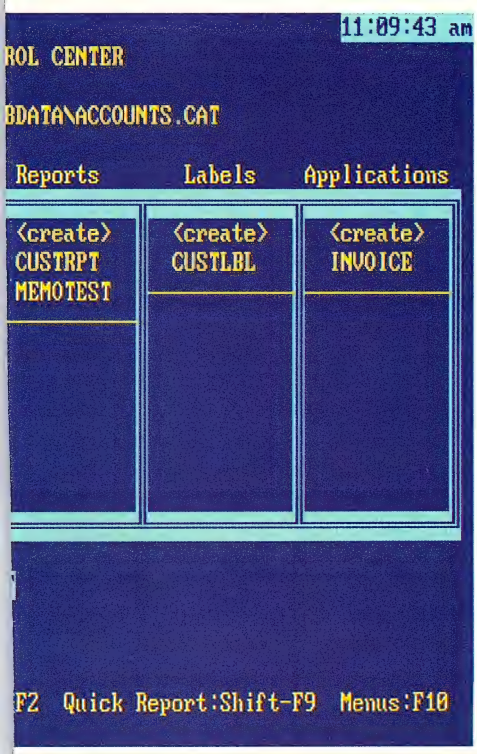
With the Advanced Debugger, you can interactively set up breakpoints to check the values of your variables to quickly determine the problem. You can monitor the variables as they change in the Display window and the built-in editor lets you edit and change programs as errors occur.

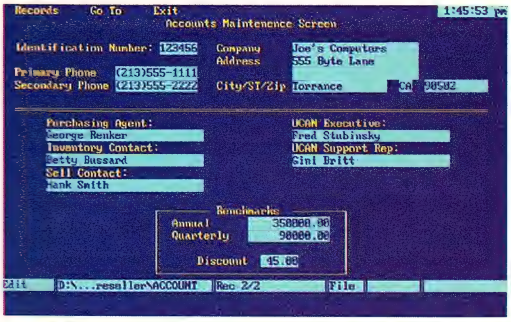


Built-in Multi-user Features:
dBASE IV includes many built-in, multi-user features for both the end-user and application development environment. These features include single-user to multi-user transparency, transaction processing, automatic screen refresh and password protection and data encryption. You can easily develop applications that allow any number of end-users to access information simultaneously from a common database without fear of data loss. And you can add capabilities such as Transaction Processing.

Problem:
Six people in your department need to access the Account Maintenance database. Three will be entering data, two will make changes and the other will run the reports.

Solution:
With one dBASE IV and a dBASE IV LAN Pack, you have a six user LAN setup. Placing the Account Maintenance database on the LAN Server will allow all six people to access the database. Automatic record locking ensures integrity, and auto-refresh ensures that users are always looking at the most current data.





Delivering the tools to the workstation.

The strength of any vision is to take what is known and expand the possibilities. Ashton-Tate provides the foundation for your business data management needs today, building toward the future. dBASE products are the standard in micro application development and personal data management on DOS. Versions will be provided for OS/2, Macintosh, UNIX and VMS platforms as well, providing leadership in usability and productivity through comprehensive platform coverage. With the introduction of dBASE IV, Ashton-Tate continues the momentum and moves forward into the next generation.

dBASE IV.

dBASE IV is the next generation that provides levels of ease of use, speed and power with a combination of features never before available for personal computer users.

The Control Center is the next generation interface that makes your job easier by letting you access all the power without programming for personal data manipulation. Involving interactive queries, reporting and data manipulation, dBASE code is automatically generated and a built-in compiler automatically compiles your application for execution speed significantly faster than dBASE III PLUS.

dBASE IV represents the latest generation of the dBASE family and builds on the industry standard language features of this relational database by adding over 310 new and enhanced dBASE commands and functions. In addition, dBASE IV offers a full implementation of IBM's SAA-compatible Structured Query Language (SQL) bringing unparalleled power and flexibility to the programmer for improved productivity and extendibility for future connectivity solutions.

dBASE IV Developer's Edition.

For the developer, this edition provides the complete dBASE IV software with additional programming tools, utilities, two additional LAN keys for multi-user testing, and a royalty-free application distribution module to provide the most complete environment for application development, testing and distribution available.

RapidFile.

RapidFile® is the economical entry path to Ashton-Tate's database product line. It is a fast and easy-to-use file manager for lists, labels, reports and form letters. RapidFile is specially designed for novice to experienced users who want to manage lists of information quickly and easily, but who do not need relational capabilities. Upgrade pricing is available from RapidFile to dBASE IV.

dBASE III PLUS.

The industry standard will continue to be provided for users who have lower memory requirements or dual floppy systems. Applications developed in dBASE III PLUS are 100% upwardly compatible to dBASE IV, thus ensuring continued support of your investment to minimize cost and save time.

Future versions.

Leadership requires an understanding of user demands and the ability to develop an appropriate solution for them. Ashton-Tate's leadership is founded in their dedication to meeting users' needs for application portability and a common interface across key operating systems to leverage their workstation investment now and in the future.

ASHTON-TATE FUTURE DATABASE DIRECTIONS

Character-based Interfaces	dBASE Control Center dBASE/SQL DOS	dBASE Control Center dBASE/SQL OS/2 1.0	dBASE Control Center dBASE/SQL UNIX	dBASE Control Center dBASE/SQL VMS
Graphics-based Interfaces	Presentation Manager dBASE Interface/Tools dBASE/SQL OS/2 1.1	Macintosh dBASE Interface/Tools dBASE/SQL Multi-finder	Open Look dBASE Interface/Tools dBASE/SQL UNIX	DEC Windows dBASE Interface/Tools dBASE/SQL VMS

Ashton-Tate will be delivering future versions of the industry standard dBASE products with the familiar character-based Control Center interface on DOS, OS/2, UNIX and VMS with guaranteed application portability. This new environment will allow its users to select the best hardware and operating system for their own applications with the assurance that they can leverage their investment in the future.

Future versions will include a graphics-based interface for next generation ease of use and utilize the new functionality of the OS/2 1.1 Presentation Manager. This graphics-based interface will be the foundation for future solutions under Macintosh, UNIX Open Look and VMS DEC Windows. These are the kind of solutions that will maintain Ashton-Tate's leadership in microcomputer relational database management systems and extend that leadership to new platforms.

ASHTON-TATE®

Leadership in workgroup computing.

The first PC-based workgroup solutions were file server LANs with each workstation having its own processing power for greater personal computing flexibility plus file sharing — at a more economical cost than multi-user minicomputers. However, file servers did not provide the transaction processing performance, data integrity, crash recovery and central data management control typically provided by a minicomputer database.

Minicomputer databases suffered from the high cost of application development and maintenance, limited customizability, limited individual productivity and lack of user-friendly interfaces. It was difficult to build a minicomputer solution that fits the needs of today's end-user environment.

A need clearly surfaced for a synergistic approach that could combine the capabilities of the minicomputer database with the benefits of the familiar workstation database. The result would be dramatically improved performance, while retaining centralized control and better data integrity at a lower cost.

The next generation workgroup solution.

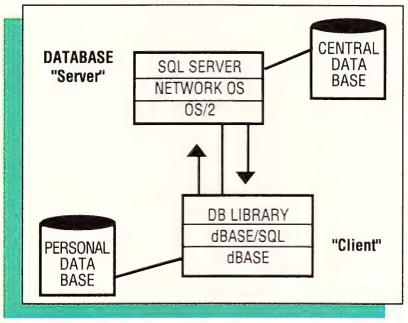
Database servers based on a client/server architecture provide a superior solution as the next evolution of database management systems for workgroup computing. Unlike a file server, a database server has database processing power of its own. The database server's processing power also offers the benefits of the minicomputer-based network (performance, integrity, administration and concurrency) at only a fraction of the cost. As a result, processing can be split to be more effectively distributed between the server and the LAN workstations.

The Ashton-Tate/Microsoft SQL Server is a database server that will provide the benefits of a distributed processing environment. With its roots in the more powerful environments of minicomputers, its heritage provides the opportunity to build a product that offers the best of both worlds.

The structure behind the change.

SQL Server is a major breakthrough in workgroup computing. Based on an advanced model called a Client/Server Architecture, the client/server model segments database operations and exploits the strengths of each system component. When SQL Server is teamed up with Ashton-Tate's dBASE IV, the combination creates the best solution for workgroup computing needs now and the next evolution for future data management systems.

CLIENT/SERVER ARCHITECTURE



The back-end ("server"), SQL Server, handles data input/output and transaction processing activities using large and high band-width data storage devices. The server delivers the benefits of traditional on-line systems — database level security, transaction processing and production database power, sophisticated data sharing and high system availability.

As the front-end ("client"), dBASE IV provides the power and ease of use of a highly interactive personal data management system and access to all the applications. Running on PCs over local area networks, the combination replicates all the data integrity, performance and superior security typically associated with mainframe and minicomputer DBMS — at a fraction of the cost. All while maintaining the integrity of a central database management system. SQL Server also offers other features like server scalability which lets you add more or larger servers to a workgroup and is an open platform for applications written in other languages.

From an application development perspective, dBASE IV offers significant advantages over other client solutions utilizing 3GLs like Cobol and C languages. The dBASE/SQL language in dBASE IV with its highly integrated WYSIWYG (What You See Is What You Get) tools provides a more productive and easy-to-use environment for application development, testing and distribution.

Building cooperation.

In the future, dBASE workgroup computing will offer several alternatives for the user and provide the greatest flexibility for true office connectivity through shared database resources. Users will have the flexibility of choosing SQL Server as today's back-end of choice for database server capabilities, selecting the LAN Pack file server configuration for simple multi-user sharing of data for a low-cost situation with minimal application requirements, or in future versions accessing other database servers as they become available from vendors such as IBM and DEC. Ashton-Tate is committed to providing access from dBASE products on the workstation to future database servers on UNIX and VMS-based minicomputers.

The key for growth is being able to select the computing platform that best meets your application processing needs and utilize your data and application investment to minimize your costs.

IT'S NO WONDER PEOPLE THINK OF US AS THE dBASE COMPANY.

We did, after all, pioneer what has become the most widely-used database management system for personal computers on the planet.

While at the same time adding a full complement of Ashton-Tate® products that enhance the dBASE® standard even further.

Products like dBASE IV™ Developer's Edition, which gives you a complete set of programming tools, utilities, and royalty-free run-time distribution.

dBASE IV LAN Pack, adding as many as five simultaneous users to your dBASE IV installation in a networked environment.

CHART-MASTER®, which makes the production of business charts and graphs using dBASE data as easy as pie. Or as bars. Or lines.

RapidFile™, a fast and easy-to-use a file manager designed for business people who work with lists, mailing labels, and form letters.

And dBASE DIRECT/36™ and dBASE DIRECT/38™, which let you transparently access system 3/X data as if it were on your PC.

Naturally, you'll find the highest degree of compatibility among all the products in the dBASE family—from being able to share files between CHART-MASTER and RapidFile, for example, to having all of your dBASE III PLUS™ applications automatically run in dBASE IV.

All of which reinforces dBASE as the industry leader.

But then, it's really no wonder.

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IT'S A WONDER PEOPLE THINK OF US AS THE dBASE COMPANY.

We do, after all, offer one of the most complete and advanced product lines of any software company on the planet.

Products that go beyond those in our flagship dBASE® environment to set standards for power and performance in other areas as well.

Areas such as presentation graphics, where DRAW APPLAUSE™ takes your text and data and transforms them into impressive charts and graphs. And where BYLINE™ lets you be a desktop publisher—even if you're not.

Areas like integrated software, where FRAMEWORK III™ lets you bring all your work—from spreadsheets, databases, and text documents—together in a single, cohesive, and intuitive workspace.

And finally in the Macintosh arena, where FullWrite Professional,™ a tool that combines powerful word processing and page layout capabilities, is quickly establishing itself as one of that environment's leading products.

As is Full Impact.™ A presentation spreadsheet that gives you the ability to transform your data into clean, crisp, and understandable documents.

And dBASE Mac, a powerful database with the sophistication of the Macintosh.

Beyond software, we also provide a wide range of support for our customers, including publications, training, and even a fast-turnaround graphics service.

But why take our word for it? See all our products at COMDEX in Meeting Room B-3, East Hall, LVCC. You'll be just as surprised as we are that we're often seen as just the dBASE company.

It's a wonder, really.

ASHTON·TATE®

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Sharing information in an expanded environment.

Access to what is known as "corporate data" (information essential to the livelihood of a company such as customer orders, inventory and accounting) has traditionally been stored, controlled and analyzed on a corporate mini or mainframe.

To date, corporations have invested a tremendous amount in their existing corporate DBMS environments. In many cases, there may be multiple DBMS program products serving different data management functions. This type of environment is described as being heterogeneous because it involves many different database types across many different platforms.

As the microcomputer increased in power and functionality, users found they could do many of the analyses MIS used to handle on the corporate mini/mainframe at their desks. Transparent access to data suddenly became a catalyst in the drive to integrate micro, mini and mainframe environments.

With the inherent accessibility problems posed by the mini/mainframe system, the micro DBMS interface has proven to be the superior solution because it satisfies the user's need for a transparent, immediate and easy-to-use approach to data management from their workstation.

Therefore, the key in designing a viable connectivity environment lies in enabling the company to take the existing DBMS environments it now employs and connect them through common data access languages (such as SQL) and industry standard communications facilities. And at the same time, provide the end-user with a comfortable and familiar way to realize this connectivity and take advantage of it at the workstation level.

Ashton-Tate's Heterogeneous Connectivity Solutions.

The Ashton-Tate family of connectivity products will let you transparently access data and integrate dBASE applications with your current database systems on mini and mainframes. The workstation user does not have to deal with the complexities of the mini and mainframe while MIS continues to control and manage centralized database investments.

The initial connectivity products targeted by Ashton-Tate are the IBM midrange computing environments. dBASE DIRECT/36™ allows querying, manipulating and reporting on System/36 data transparently through dBASE III PLUS. dBASE DIRECT/38 provides the same capabilities on System/38 files.

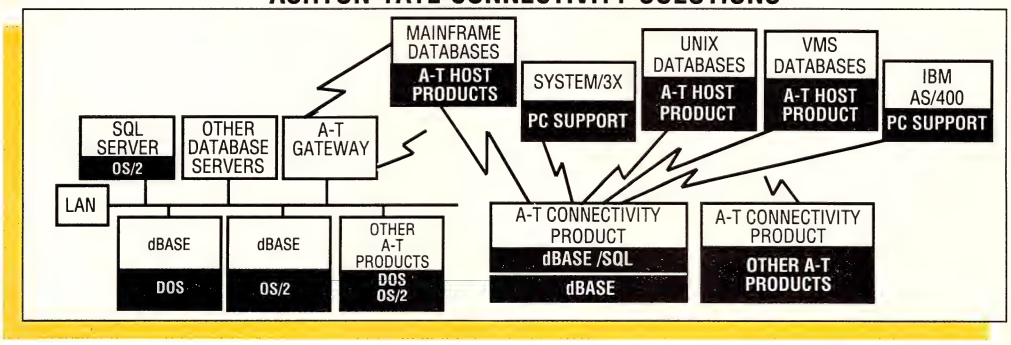
In the longer term, Ashton-Tate's heterogeneous connectivity solution is targeted to cover the IBM System/3X, AS/400, OS/2 Servers, UNIX, VMS and future mainframe platforms in a phased approach.

In Ashton-Tate's view, connectivity is represented by a variety of clients hooked to multiple servers, which in turn tap into the corporate data source, be it a minicomputer or mainframe. They also see it as intelligently linking single, stand-alone clients with corporate DBMSs through applications integration.

Two key components to this solution will be transparent data access and application integration. Transparency will allow the user to make a request of a remote data base without knowing where it is stored or how to deal with the complexities of the host database system.

Application integration will permit the PC user to directly access remote databases from within Ashton-Tate PC applications. This type of integration leverages customer's investments in mini, mainframes and PCs. Ashton-Tate's connectivity solutions will bridge the gap between dissimilar worlds.

ASHTON-TATE CONNECTIVITY SOLUTIONS



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Glossary of Database Terminology

Application: A software program that is designed to accomplish a specific task. A database management program is an application, so are word processing and spreadsheet software programs. Applications software can also have a more narrow focus such as tailoring a general database management program to serve accounting or inventory management functions.

Client: Workstation software that utilizes the services of any type of server on a network.

Database management system (DBMS): A consistent method of storing, organizing, retrieving and calculating data in database files.

Database server: Software and hardware (usually a microcomputer) that operates as the designed "hub" of a local area network. This "hub" stores the network's shared database files. In addition to managing the distribution and retrieval of these files, the database server offers additional data manipulation and protection capabilities.

Database file: A file used for storing and organizing information. Some computer database files are organized in table format with information arranged in rows(records) and columns (fields).

Dataframe: A conceptual term referring to the computer system - usually a minicomputer or mainframe - a corporation employs to store information essential to its livelihood (such as sales, order entry and inventory).

Field: The smallest unit of information in a record.

File server: A common term for the software and hardware that perform the storage, distribution and retrieval functions for shared files in a local area network. The file server controls the network communication and the definition and sharing of network resources.

Heterogeneous database environments: Distinct computing platforms upon which database software is designed and operated. Each of the current platforms (there are three: microcomputer, minicomputer and mainframe) represents a different level of technology with its own methods of operation.

Links: Software tools that allow heterogeneous database management programs to share files.

Local area network (LAN): A system in which a group of microcomputers and peripheral devices are linked together (through hardware and software) to allow data and resource sharing among the members (also called nodes) of the LAN.

Multi-tasking: Procedures in which several separate but interrelated computer tasks (for example, creating a word processing document and updating a database) operate under a single program identity.

Programming language: A set of computer commands that form a procedure, or language (complete with its own syntax and structure), by which software programmers design and implement computer software programs.

Operating system: The master control program that directs the internal operation of a computer (MS-DOS and OS/2 are microcomputer operating systems).

Query: A specific request for data or instructions in a computerized DBMS.

Query By Example (QBE): A method of making database queries in a graphics manner, rather than an English-like or programmatic manner.

Record: A group of related fields of information treated as a single unit.

Relational database: A system that allows data to be accessed based on relationships set up among several database files.

Transaction processing: The running of a sequence of database operations as a single unit of work.

Transparent data sharing/access: A characteristic of advanced workgroup computing technology in which a user can retrieve and view data regardless of where it is stored within the computing environment — microcomputer, minicomputer or mainframe DBMS.

User interface: The means by which a computer and a user communicate. It is the collection of everything the user sees, hears and does while activating the computer to perform some task.

Workgroup: Best described as a corporate department or division in which computer users (usually in a LAN setting) require data access and sharing capabilities to carry out their departmental objectives.

Workstation: An individual personal computer connected to another within a network.

The language of the present and the future.

The dBASE language is the standard for DBMS applications development on the microcomputer. It is recognized as the most comprehensive and productive application development environment compared to any other micro-based DBMS language and other 3GL languages such as COBOL or C. dBASE IV further extends the standard by adding significant language functionality that far outstrips any competitive products in both its level of flexibility and productivity.

The key to dBASE IV is its integration of the language with the usability and productivity of its Control Center tools. The Control Center provides an easy to use WYSIWYG interface that gives you access to all the power of dBASE without having to deal with the language or develop programs. The synergy creates a highly integrated environment with dBASE/SQL as the integrating language foundation.

What is needed is a common way of accessing data. SQL is the emerging data access language standard. However, while SQL provides a common way of performing queries and manipulating information, it lacks the capabilities of a complete application development environment. As a result, many companies have to rely on COBOL, C or utilize the vendor proprietary language with embedded SQL (ESQL). In all those cases, considerable expertise is required to build applications.

The advantage of dBASE/SQL is that it provides a strong programming environment that is intuitively geared to database application development. With the strong programming and user-familiarity strengths of the dBASE language and the power and data access language of SQL, dBASE/SQL is the strongest solution available today for the increased demands of database application development and an important protocol on which to build future connectivity solutions.

A natural evolution.

As business information requirements grow more complex, an appropriate integration of technologies will be critical to meet the demand. An effective combination of mini/mainframe and PC functionality must be developed to answer that need for an integrated office environment.

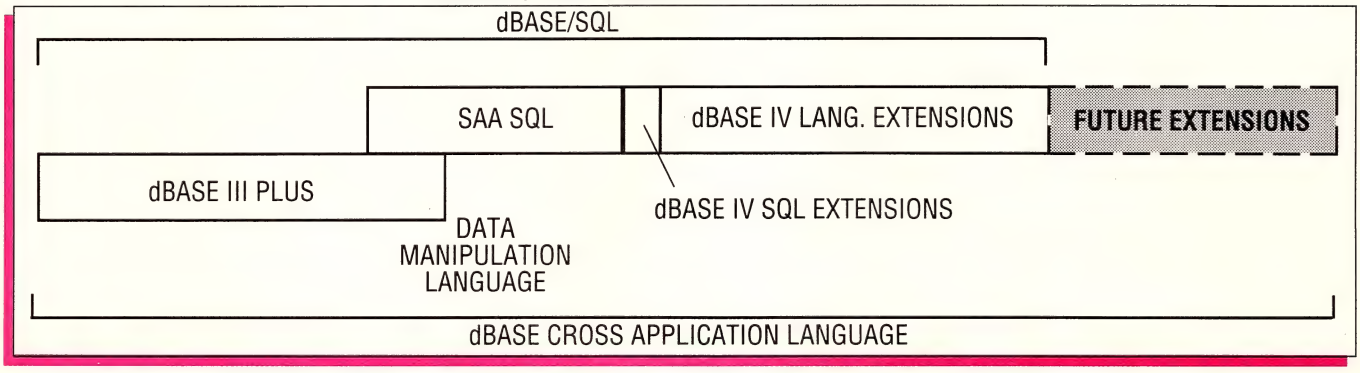
Ashton-Tate understands that creating efficiency and productivity in the individual, stand-alone environment is only a part of the solution. To be truly integrated into the future business environment and to be able to address databases existing on other computing systems such as minicomputers and mainframes, common protocols or languages are needed.

Ashton-Tate has laid the groundwork for a foundation that provides office solutions today and for the future in an ever-changing business environment. The effective combination of dBASE IV and SQL is just the beginning.

Ashton-Tate's intention is to evolve the language guided by three basic principles:

- Upward Compatibility - Assurance that current applications will run in future versions.
- Leadership Functionality - Extensive user need analysis will determine future extensions, including issues such as a cross-product application language.
- Greater Usability - Incorporating more visual programming techniques and object-orientation for easier use and greater productivity.

dBASE / SQL LANGUAGE FOUNDATION



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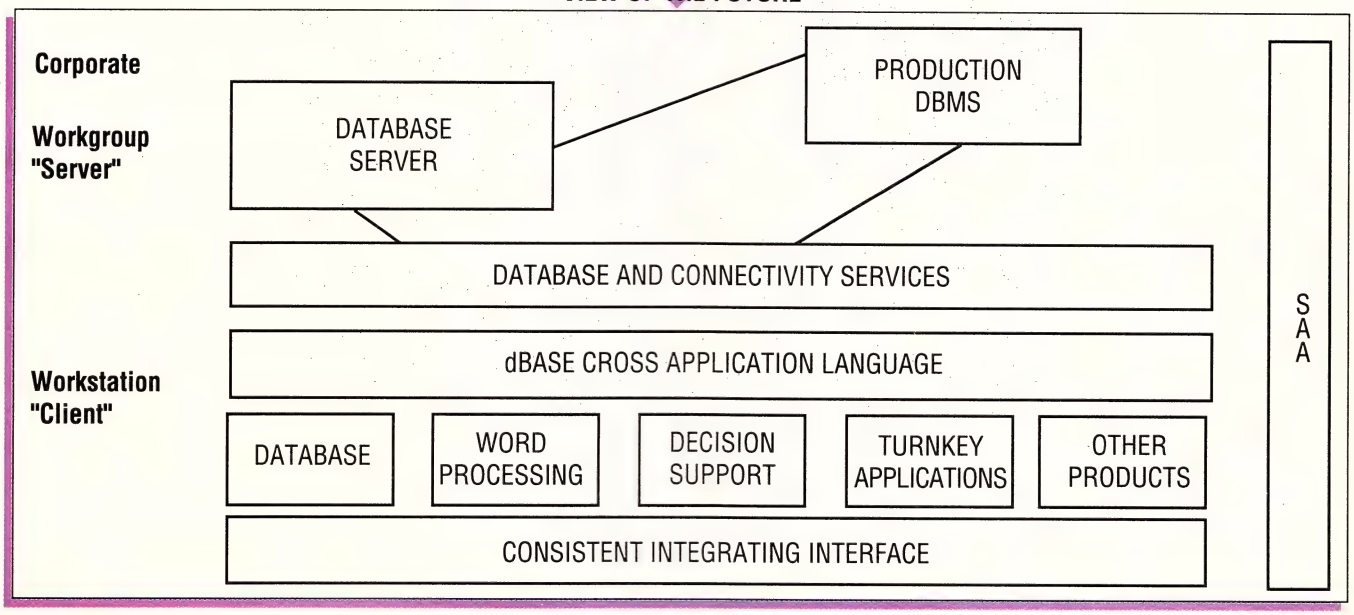
Achieving a new level of integration through the database.



The issues discussed here — stand-alone database management software, workgroup computing, client/server models, SQL, connectivity, etc. — put computing on a path toward an integrated information system solution. The database will play the most important role in making this solution a reality.

A database system has the necessary data manipulation and data management capabilities to control and manipulate essential company data. The DBMS also provides the necessary technology to build and manage complex office applications of the future that combine, integrate and distribute the processing of multiple applications across the business enterprise.

The personal data management solution at the workstation will be the focal point for the user. There, he will use multiple applications in a consistent environment, transparently sharing data between applications contained in a common data pool managed by an advanced DBMS.

At the workgroup level, the information will be stored in a server database that acts as a central integrating element of each workgroup network. Users will store and retrieve data and objects for all their software applications in this database.

In addition, access will be available to heterogeneous database types on minis and mainframes from dBASE for retrieval and optional updating across a wide range of operating systems.

At the same time, the corporate database managers will be able to monitor raw data flow and storage with the necessary level of control and security.

Ashton-Tate has laid the groundwork. dBASE IV is the leading technology which signficantly raises the PC database standard. It is a foundation that provides office and information systems solutions today and for the future...in an ever-changing business environment.

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You own some flavor of dBASE® right now—dBASE III PLUS,™ dBASE III,® or even dBASE II.® And you'd like to get your hands on dBASE IV,™ at a reasonable price.

We understand. Which is why we're offering registered users the opportunity to get dBASE IV at the low price of $175* (if you bought dBASE III PLUS between February 17, 1988 and the release of dBASE IV, your upgrade price is only $30). There are also upgrades to dBASE IV Developer's Edition.

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(that's 1-800-227-4866) and we'll fill you in with all the details.

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**Volume discounts are available; prices do not include shipping and sales tax.*

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The new Z-248/12™ and Z-286 LP™ desktop PCs. Two new master-strokes that respond to today's need for smaller size and maximum expansion. Two more reasons why Zenith is the leading supplier of AT-compatible systems.

The compact Z-286 LP combines a four-inch low profile and space saving small footprint with performance you'd expect from a unit three times its size.

The Z-286 LP comes standard with 1MB RAM—expandable to 6MB without using an expansion slot. Generous memory capacity to run new MS OS/2™ applications. And with a single 3.5" floppy and fast 40MB hard disk you have truly impressive storage capacity.

The Z-248/12 is among the fastest 286 systems available. Its zero wait state design magnifies its 12MHz to speed past 16MHz systems with wait states.

The Z-248 is also standard with 1MB RAM and is expandable up to 6MB without using an expansion slot. However, four open expansion slots can artfully handle future growth. Configurations of 5.25", 3.5" floppy or 40, 80 and 160MB hard disks truly expand all your options.

All systems are available with Zenith's revolutionary Flat Technology Monitor (shown above) and VGA-compatible video card for ultimate video performance.

With breakthrough after breakthrough, these new computers are yet further proof that Zenith's AT-compatibles define the State of the Art. See the "AT Collection" now showing at your Zenith Data Systems authorized dealer. For your nearest location call: 1-800-553-0350.

ZENITH | data systems

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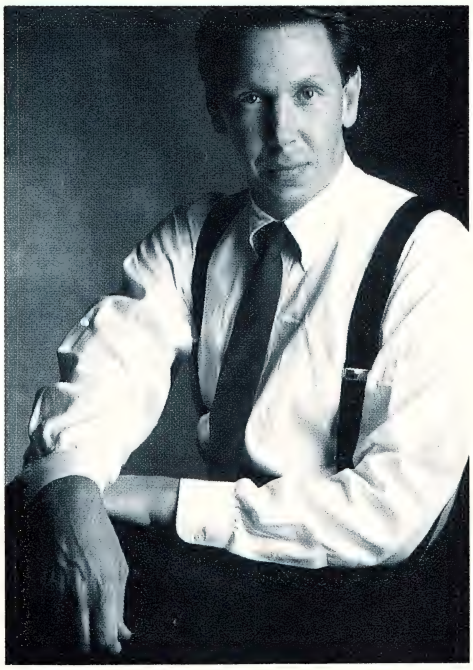
Edited by ERIC BENDER

Double Trouble for Rivals?

Oracle's Successful SQLs

Soaring on Data Base Management



Oracle rapidly gains PC market share under CEO Larry Ellison.

Oracle Corporation only recently decided to push its relational data base management program into the PC market. Yet a little over a year after *Oracle*'s April 1987 debut, the program was battling it out for the number two position behind Ashton-Tate's *dBASE*.

"We are a very aggressive company," says Oracle's hard-driving founder and chief executive, Larry Ellison. Indeed, he's famous for saying his ideal marketing vice president would be Genghis Khan—it's not good enough for Oracle to win sales; everyone else must lose.

"Oracle has brilliant and aggressive marketing," concedes an official at a rival firm, "but we rarely lose to them technologically. They just seem to find sales opportunities no one else sees."

Ellison calls that opinion "utterly ludicrous." He insists Oracle is both the technology leader and the marketing leader.

He may be right. Oracle claims to have the only relational data base that runs exactly the same way on mainframes, minicomputers, PCs, and LANs. A user can start out with an application on a PC, add it to a PC network, and later migrate to mini or mainframe as the need arises. Not even IBM can offer that flexibility. Oracle's only noticeable product vulnerability, another opponent observes, is in the quality of its end user tools and report generators.

Oracle attributes its rapid rise to a 1977 decision to build the first commercial data base supporting Structured Query Language (SQL), which facilitates the movement of data between computers, regardless of architecture. The accompanying decision to program *Oracle* in the portable C language made the move to PCs relatively easy.

"We made a lot of good or lucky decisions back in 1977," Ellison says. Since then, the Belmont, California, software company has doubled sales in 10 out of 11 years. In the most recent fiscal year, ending in May, profits surged 175 percent to $42.9 million, based on a 115 percent increase in revenues to $282.1 million.

About 10 percent of sales came from PC products. Ellison is committed to overtaking Ashton-Tate as the top PC data base company, and he isn't coy about his intentions—witness the widely circulated ads with an Oracle jet shooting down an Ashton-Tate triplane.

"If you're a corporate user of data base software for PCs, you better keep your eyes on Oracle," boasts Gene Shklar, director of marketing for

(continues)

Businessland Flourishes

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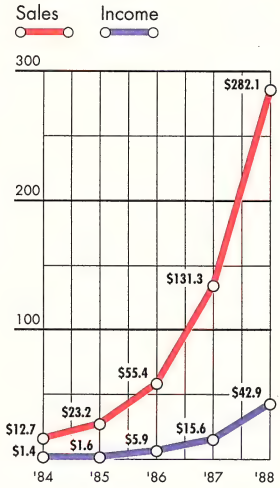
How do you build a billion-dollar computer chain?

A few years ago when Businessland was launching its retail chain, common wisdom held that franchising was the road to rapid market penetration and purchasing clout. But Businessland avoided that route, and its success became the prime argument against franchising.

(continues on page 90)

Oracle's Quick Rise

(in millions)



Source: Oracle Corp.

Oracle's sales are soaring even faster than these yearly figures indicate. The data base management system vendor posted $104.2 million revenues in the fourth quarter of its 1988 fiscal year, ended May 31.

Intel, DCA Put CAS on the Line

Embedding Batch Communications

Intel's vision was profoundly simple: You should be able to transmit your working file from within your spreadsheet, word processor, or other application to a co-worker just as easily as you can print it.

But this scenario demands an extremely high-level interface that allows application developers to embed a communications hook with absolutely minimal effort, and someone to tackle the follow-on connection tasks in all their depressing variety and agonizing complexity.

Intel took up the challenge, and the vision has materialized for users of *1-2-3*, *WordPerfect*, and a few other packages who buy Intel's Connection CoProcessor fax/modem board (see *Product Outlook* in this issue). Guided by simple menus, they'll be in touch over phone lines with other comparably equipped users. Early next year, owners of Hayes-compatible modems and Irma micro-to-mainframe boards also will be able to join up.

However, Intel has even grander plans in mind, connecting to an intimidating range of LANs, big machines, public data networks, and other interfaces and applications. Intel enlisted Digital Communications Associates, with its market-leading Irma boards and *Crosstalk* communications software, as a partner. In August the two placed documentation for the high-level interface (the DCA/Intel Communicating Applications Specification, or CAS) in the public domain.

An A-list of software houses has formed around the standard, including Ashton-Tate, Borland, Lotus, Microsoft, and Symantec. Each promises to build a CAS hook into at least one product. Given the minimal development strain and the potential for substantial user benefits, most of the enlistees are highly enthusiastic about the approach. (The lone exception is Microsoft, which describes its role as "interested bystander.")

With these backers, and significant customer benefits near at hand, CAS seems a ready-made standard. But how far will the standard extend? The major modem manufacturers have withheld endorsement, saying only that they're studying the announcement and that it seems complicated by the Connection CoProcessor.

"If Intel is trying to promote a way of facilitating high-speed background communications under OS/2, that's one thing," comments Gary Betty, senior vice president at Hayes Microcomputer Products in Norcross, Georgia. "If CAS is just a spec to do batch file transfers on an application-independent basis, that's another thing."

Jim Johnson, co-manager of Intel's Personal Computer Enhancement Operation in Hillsboro, Oregon, points out that the first version of CAS is for DOS, not OS/2. Additionally, he defends Intel's CoProcessor approach as mandatory for handling high-speed communications comfortably in the background.

But focusing on these issues may miss the main point, Johnson maintains, because CAS is not restricted to a single operating system or any hardware requirements. "We designed the basic architecture for both intelligent and nonintelligent devices," he says. Recasting the installed base of modems, 3270 boards, and other equipment as CAS devices calls for software development but not necessarily hardware modification, he notes.

Like Hayes's Betty, James Dow, president of Microcom in Norwood, Massachusetts, cautions that Intel's wish list of connections will be extremely difficult to build. Johnson acknowledges the scope of the effort but promises that Intel and DCA will dedicate suitable resources.

Providing bare-bones batch communications, CAS doesn't support fancy scripting or interactive links, so it offers limited flexibility and no tools to check the news on Dow Jones. However, many users need only simple file swapping, so communications software vendors may feel the impact.

But outside observers generally give CAS a thumbs-up. "It's a terrific idea," declares Mike Millikin, senior analyst at Patty Seybold's Office Computing Group in Boston. "Today it's very difficult to take a *WordPerfect* file and communicate with someone, and this would be a transparent way." —*E. B.*

Oracle

(continued)

the PC product line. Oracle aims to run its product on all the key hardware and operating systems in the PC field.

Oracle's full PC data base software is powerful, expensive (at $1295 for each machine), and aimed primarily at networked rather than stand-alone PCs. But Oracle also sells a trimmer version that runs as an adjunct to *1-2-3*. And the company recently signed a deal with WordTech Systems to sell a *dBASE*-compatible front end for Oracle data bases.

"Their real intent with these announcements is just to upset the status quo, to try to break the mind-set that users have about Ashton-Tate in the PC data base market," suggests Kenneth Burke, analyst at Alex. Brown & Sons in Baltimore. "Their future growth in the PC end is going to be pretty significant if they can break the stranglehold."

Overall, Ellison says, he sees no reason why the company can't keep doubling sales in each of the next two years—and reach $1 billion in revenues. —*John Eckhouse*

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Setting a New Standard

HP's LaserJet Printer offered speed, quietness and quality in one machine.

Dealers took notice. So did software developers. The LaserJet Printer's ability to print multiple fonts, produce graphics, and shade areas, inspired software developers to incorporate these new features into their packages.

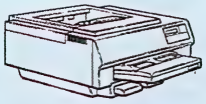
The press was intrigued. In February 1987, Hewlett-Packard's LaserJet Printer lined up with the IBM PC, Lotus 1-2-3, and Apple Macintosh on *Personal Computing's* list of "10 Most Significant Personal Computer Products of All Time."

While LaserJet Printer sales continued to grow, the product development team was busy looking for ways to enhance the printer to better meet customer needs.

Advancing the Standard of Excellence

In March 1987, Hewlett-Packard introduced the new LaserJet Series II Printer. What could customers expect from the new printer? Everything they liked about the "Classic" plus improved ease of use, font flexibility, paper management, and add-on memory. All in a lighter-weight unit that cost less than the original.

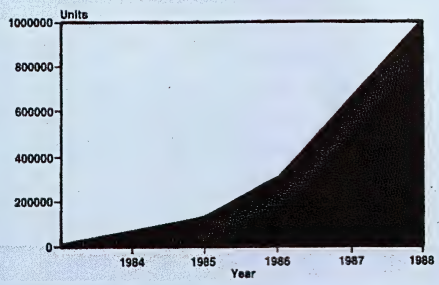
"We'd been listening closely to our customers all along", says Tom Old, customer satisfaction Q/A manager. "Maybe that's why Hewlett-Packard leads the industry in meeting people's needs for laser printing."



▲ **The HP LaserJet Series II Printer**
The most exciting advance in laser printing since HP made it affordable in 1984.

▼ **U.S. Laser Printer Industry Growth In Units Shipped**
HP's LaserJet Printer family has played a significant role in the laser printer industry growth.

U.S. Laser Printer Industry Growth



Source: Dataquest

This page was created using WordPerfect 5.0 software.

The laser printer that's influenced the entire printer industry can help you be more influential, too. The HP LaserJet Series II Printer is today's overwhelming choice for simple word processing, integrated text and graphics, and desktop publishing.

You can begin producing impressive documents right from the start because the HP LaserJet Series II Printer works with all popular PCs and more than 600 PC software packages.

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The HP LaserJet Series II Printer.

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Circle 26 on reader service card

PS/2 Compatibles Missing From Action

Demand Seen as Doubtful

MARC ROSENTHAL

Long accustomed to the most sincere form of flattery, IBM has seen surprisingly little imitation of its Personal Systems/2 line.

The industry expected a deluge of PS/2 compatibles last summer, but only a trickle appeared. Tandy did ship its entry in late July but downplayed any expectations about the machine. Dell Computer, meanwhile, has suffered abrupt mood changes—indefinitely postponing in August the PS/2 compatibles it announced with a dramatic flurry in April. Other vendors continue to make PS/2 noises, but fall arrived unaccompanied by shipments of any new PS/2 clones.

Both system and component suppliers declare that the technical problems involved in duplicating IBM's Micro Channel Architecture have been solved. And Tandy and Dell don't anticipate legal problems—although even after IBM's spring announcement of a patent licensing scheme, many vendors seem less than confident that the waters are clear of Blue sharks.

The major sticking point is lack of customer demand. While IBM has sold well over 2 million PS/2s worldwide, researchers say the company continues to lose U.S. market share to purveyors of AT-compatible machines. Storeboard's studies of U.S. dealer revenues show that IBM's take of PC sales dropped from 46 percent in second quarter 1987 to 33 percent in second quarter 1988.

In Europe, where PS/2s have met with a kinder reception, announcements of PS/2 compatibles finally began to appear in September, led by Apricot and Amstrad.

But in the United States, even Micro Channel customers have trouble pointing to benefits of the bus. If IBM has a hard time making the argument with its customers, competitors reason, other vendors would only spin their wheels. Given the legal risks plus the engineering, manufacturing, and licensing costs, why bother?

Zenith Data Systems takes a typical stance: The firm continues to develop Micro Channel–related technology, but "we may never bring it to market," remarks President John Franks.

Simultaneously, Zenith and others have embarked on multiple-processor designs built on proprietary bus architectures. These machines should offer tremendous computing power—at the risk of partly incompatible hardware that will whittle down customer choices in the 1990s.

But in September, Zenith and many other vendors joined behind Compaq in a march toward standardization via the Extended Industry Standard Architecture (see *Top of the News* in this issue). A framework for 32-bit machines, EISA should address many of the same tasks as the Micro Channel without abandoning today's PC and AT cards. Adherents say it may swamp the Micro Channel. —*E. B.*

Peachtree Keeps the Books

Spins Off From Intelligent Systems

Peachtree Software nearly ended up in the scrap heap three years ago after attempting to turn the momentum from its pioneering accounting software toward a diverse line of more horizontal applications. "We weren't smart enough to be Microsoft; we couldn't keep that many products moving," summarizes Bill Goodhew, chief executive of the Norcross, Georgia, firm.

Although Peachtree enjoyed an early edge in accounting (its program was one of the few IBM relabeled and sold during the PC's early years) its pricing had drifted off target. Peachtree's eight-module program cost almost $5000; competing packages with similar features began selling far more copies for far less.

Peachtree hit bottom in 1985, when its parent, mainframe software vendor Management Science America, sold the company for $1.1 million to Intelligent Systems, a PC products conglomerate also based in Norcross. But the move sparked a turnaround.

Slashing *Peachtree Accounting*'s price to $199, the firm added 100 features to the package and reintroduced it in 1986 as *Peachtree Complete*. Additionally, Peachtree bundled its also-ran *Peachcalc* spreadsheet with its moderately successful *Peachtext 5000* word processor for $199.

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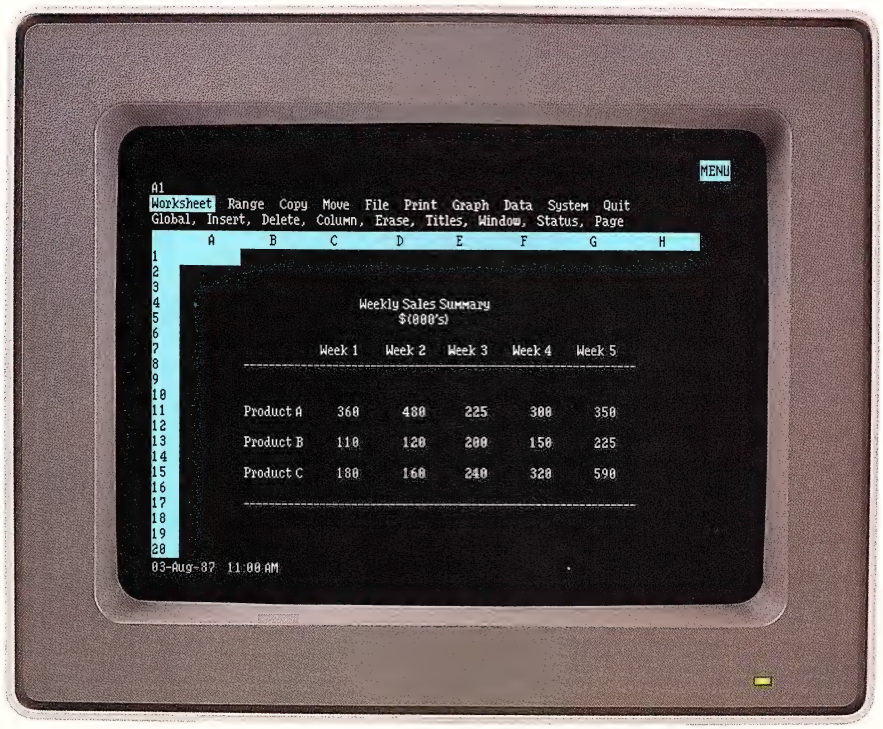


Quick–turn the page.

Peachtree

(continued)

This June, Peachtree unveiled *Back to Basics: Professional*, an easier-to-use version that costs $199. ("Our sales department can't remember different prices," Goodhew jokes.)

The company has been profitable since 1986, and Goodhew and several other executives, backed by venture capital, recently offered Intelligent Systems $20 million for an 80 percent share. The buyout of the 64-employee firm has won preliminary approval from the current parent. Former Peachtree head Ben Dyer will return as chairman, while Goodhew remains president and chief executive.

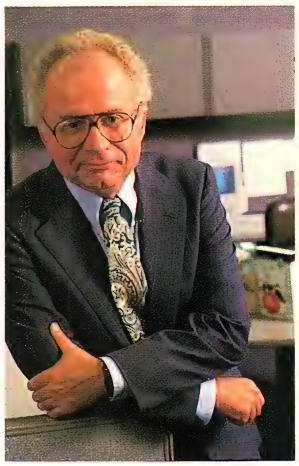
Peachtree Complete will continue to be sold mainly through direct and retail channels. For accounting software, where considerable hand-holding is needed, such a strategy entails some risk, particularly since Peachtree charges for support ($1 per minute, with a $20 minimum).

Sophisticated PC accounting programs have traditionally been sold to end users through accountants and consultants. That works fine with a high-margin price, but Goodhew says even some retailers dropped *Peachtree Complete* when its price dropped to $199. Today, consultants and accountants are responsible for only 28 percent of *Peachtree Complete* sales. The rest are made directly via an 800 number (30 percent) or through retailers (42 percent).

This volume-oriented strategy puts Peachtree face-to-face with DAC, whose $99 accounting program is the market's volume leader, according to Bill Higgs, vice president of software research at InfoCorp. Peachtree today is among the top ten—not top five—PC accounting software makers, says Higgs. Fortunately, Peachtree profits from an installed base of 250,000 copies—a big plus in an arena where replacement sales are crucial.

Peachtree has development efforts under way for *Windows*, OS/2's Presentation Manager, and the Macintosh, but "two out of the three will be learning projects," Goodhew says. He hints that the *Windows* applications will get the nod, but cautions against expecting products before mid-1989. And the firm will enter no new software markets in the next two to three years. With characteristic good humor, Goodhew says that accounting software "is all this old peanut-brain can think to do."

—Edward Warner



Peachtree president Bill Goodhew plans to stick to the knitting.

Vendex Targets Consumer Stores

Bundy Helps Make a Bundle

Professional wrestler King Kong Bundy may lack the subtle charm and human appeal of a Charlie Chaplin or an Alan Alda, but then, Vendex doesn't want to sell computers the way IBM does.

In the TV ads, Bundy, a *completely* clean-shaven giant of no known intellect, climbs into the ring and learns to use a Vendex HeadStart computer in 23 minutes. It's a powerful image for the technophobic millions, and one that Vendex claims sold about 100,000 computers in the past year.

Headquartered in the affluent suburb of Great Neck, New York, Vendex Technologies is a subsidiary of a 104-year-old, $10 billion private Dutch conglomerate. Vendex International holds a majority interest in Barnes & Noble bookstores, Software Etc., and various department stores here and overseas.

Vendex Technologies is trying to get computers into consumer electronics stores, the places you go to buy VCRs or refrigerators. More to the point, it's packaging computers like VCRs.

In these stores, consumers are comfortably spending thousands of dollars, says Harry Fox, the quick-talking executive vice president of Vendex Technologies. At the same time, the outlets "are looking for home office goods to offset slower growth in traditional electronic equipment." Hence the everything-you'll-ever-need-in-one-package HeadStart: $995 for a starting configuration with monitor and basic productivity software.

Which came first, the computer or the egghead? "The product came first," Fox says. "It was designed to be as idiot-proof as possible. We came up with an extremely effective approach of showing someone who clearly is not your power user."

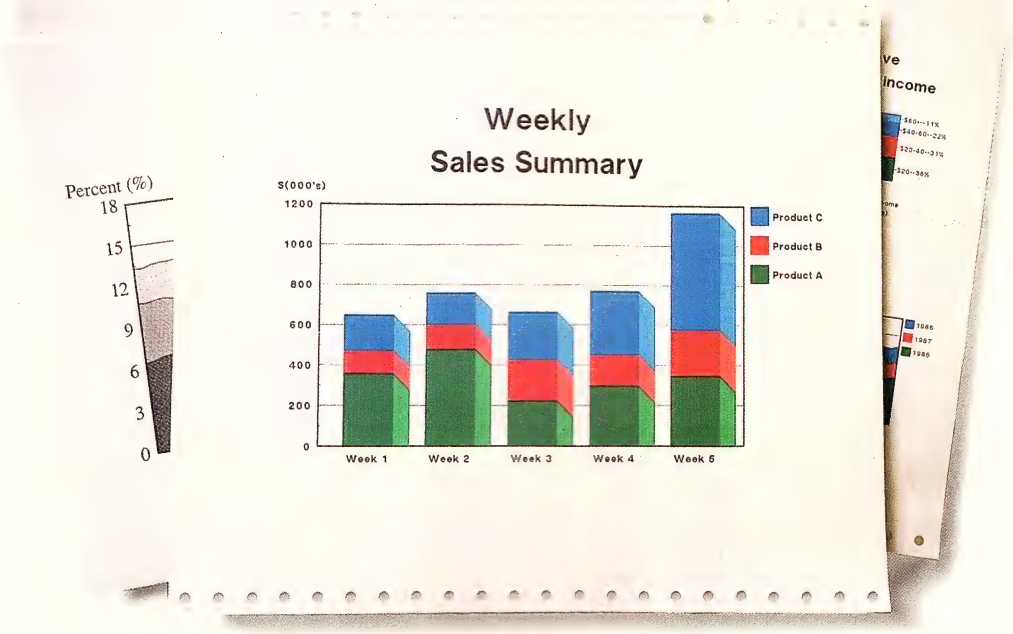
Other vendors have gone the same route—powers such as Commodore, Atari, and even IBM with the late lamented PCjr. Fox says the quality of Vendex's Korean hardware, its bundled software, and its turnkey system approach all help it crack the market.

Vendex is moving into more powerful 80286 and 80386 machines, still emphasizing simplicity and complete systems. But Bundy won't be going upmarket. He'll remain, Fox says, in "a limited role geared to the 85 to 90 million households that don't have a computer."

Less prime time for Bundy? OK—but who breaks the news to him?

—Daniel J. Rosenbaum

ED LAVIO



That's how much effort it takes to turn data into graphs with Graphwriter II.

Actually, it may take even less effort than that. You see, Lotus® Graphwriter® II is the only graphics software that lets you automatically generate large quantities of quality graphs based on current spreadsheet and database information. All with a single command.

Do you regularly need to create a variety of graphs from continually changing data such as daily inventory, monthly P&L or quarterly head count? With Graphwriter II you can create a direct link to data in your 1-2-3,® Symphony,® dBase® or ASCII files. So whenever you update your data, you can automatically update your graphs with a single command. What's more, with one keystroke you can toggle back and forth between your data source and Graphwriter II to view and select the data to be graphed. No more printing out files and time-consuming rekeying.

Graphwriter II is a full-fledged production system. You can automatically output up to one hundred charts at a time with a single command. You can even print multiple charts on a page.

And Graphwriter II offers you 24 different graph types—more than any other PC graphics package. So you can choose the chart type that best represents your data.

What's more, you have control over hundreds of style settings such as type font, heading location, bar width and color.

So if you need to create and frequently update graphs from ever-changing data, you need Lotus Graphwriter II.

Lotus Graphwriter II

To get a free self-running Graphwriter II demonstration kit, call **1-800-345-1043** and ask for demo kit AJO-2524, for 5.25″ format, or demo kit AJO-2664 for 3.5″ format.*

Then you can turn *this* page too.

Lotus Graphwriter II

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Businessland

(continued from page 83)

The San Jose chain's fiscal 1989 sales should easily top $1 billion, and it boasts an enviable list of corporate accounts.

"Businessland is in a very attractive position," declares Kevin McCarthy, analyst at Mabon Nugent & Co. in New York. The six-year-old chain appears to be in a better position than any other reseller to offer cost-effective networking and other connectivity solutions to big business, he explains.

Businessland's advantage can be traced to that 1982 decision by cofounders David Norman and Enzo Torresi not to sell franchises. Unlike rivals such as ComputerLand and Entré, the firm owns all 94 U.S. Businessland Centers, 1 Canadian outlet, 10 in the United Kingdom, and 24 ComputerCraft stores in Texas and California.

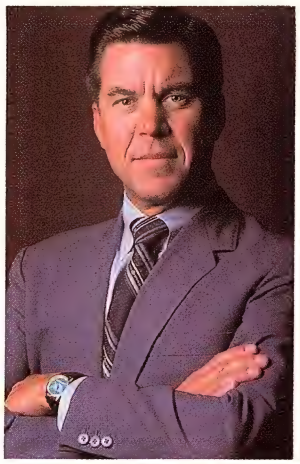
In the brutally competitive arena of PC sales, where most retailers operate on net margins below 8 percent, Businessland stores enjoy a definite pricing advantage over competing franchisees. (ComputerLand stores must pay the franchiser 5 percent off the top.) Central buying also makes it easier to command the best prices from suppliers and to standardize on products and services. That, McCarthy notes, is a godsend for customers charged with equipping and supporting offices that stretch from Massachusetts to California.

Then too, Businessland can't be considered a retailer; 80 percent of a center's revenues comes from outbound sales efforts. In fact, the company has a reputation of being almost unfriendly to customers who wander in without an appointment. That modus operandi may be changing, however, as a result of a $23 million stock swap last summer, in which Businessland acquired the retail-oriented ComputerCraft chain.

At first glance, it seems a strange pairing. While the two chains sell a similar mix of IBM, Compaq, and Apple computers and accessories, Businessland's offices are as subdued as corporate boardrooms and often nearly vacant unless a training class or demo is going on. By contrast, ComputerCraft operates a number of "superstores," usually crammed with colorful displays that shout at the customers milling about. Small business, home, and educational tools are a strong focus.

As Senior Vice President James Heisch emphasizes, "Businessland is not a retailer. It's an outbound sales force with a facility to provide demonstrations and training for our clients." But if ComputerCraft can seize some retail opportunities, so be it.

"Retail is not dead," says JoeAnn Stahel, president of the Dallas research firm Storeboard. She credits Businessland with leading the industry into outbound sales. Now, she says, the chain is pointing the way back into a fresh retail boom that's sparked by improved price/performance levels delivered by the 80386 chip.



"Businessland is not a retailer," stresses senior VP James Heisch.

CRAIG MOREY

Plans call for ComputerCraft to continue operations under the same name, with the same retail orientation. However, it is destined to swim upscale, addressing the increasing needs of small businesses by sharing Businessland's vaunted support capability. That technical structure is key to both divisions as they move into ever more complex networked systems.

Businessland installed 45,000 network nodes in its last fiscal year, and the number is expected to double this year. But such rapid growth requires top-notch talent, analyst McCarthy notes. "If you're a top engineer coming out of school and you have a choice of working for Hewlett-Packard or Businessland, most people are going to choose Hewlett-Packard," he adds.

To buck that trend, Businessland—which posted a profit of $19 million last year—plans to spend almost as much this fiscal year on training system engineers and sales and technical staff. And, practicing what it preaches, the company has tied its stores into one of the industry's largest wide area nets.

As founder Norman once remarked, "In this business, a quarter is like a year, and a year is like five years." From the beginning, Businessland has responded quickly to fast-shifting market opportunities. Last spring, for example, it launched a catalog of discount software and mailed a million copies.

But since start-up, Businessland has studiously avoided price competition, concentrating on adding services and support and charging for them. This approach is paying off: sales per employee have risen steadily, from $296,000 in fiscal year 1987 to $360,000 in fiscal year 1988. Profits have finally risen above the paper-thin 1 percent-of-sales level, where they hovered in the early years, to more than 2 percent.

The chain now employs slightly more than 3000, and it will continue to expand, says Heisch. Both Businessland and ComputerCraft logos will appear in new geographical markets, particularly Canada and Continental Europe. —*Mark Henricks*

John Eckhouse reports on business for the San Francisco Chronicle, *Mark Henricks is a Dallas business writer, Daniel J. Rosenbaum wrestles with computer and communications issues, and Ed Warner is a Boston-based writer on high technology.*

TWO-FISTED MANAGEMENT
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marek, 32
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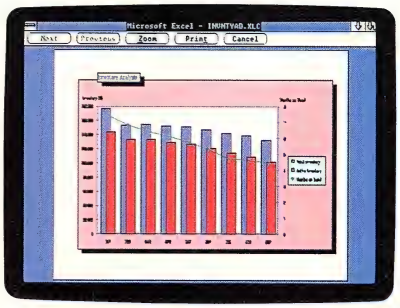
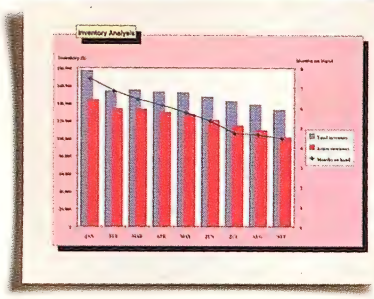
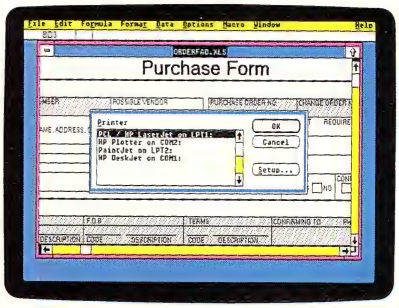
Peters! Are these your kids? I'm impressed! How do you do it on your salary?!!
Keep it up
HARRIS PICN
IT'S A TIME FOR BOSS AND WORKER TO RELATE AS JUST PLAIN FOLKS.
Ah, horseshoes
A.H.
McAfferty! C'mere!!
Let's toss a few, eh, Mac!?
Uh, I don't know, Mr. Harris; I've got to...
WHOOSH
WHOOSH
God, how'd I get into this?
Nice throw, Mr. Harris
CLANK
That's good. I'll never be able to beat that toss. I'll just let him win and he'll think...
Wait, wait. If he suspects that I'm not trying hard enough he'll think I don't have that competitive spirit, that aggressive go-getter drive...
But if I win that could really be bad news!! But if I, if I if I... hominy hominy hominy...
Mac! Throw already
Gasp
Pound! pound!
Wow, I've never seen anyone blackout playing horseshoes!
Stand back

MARK MAREK





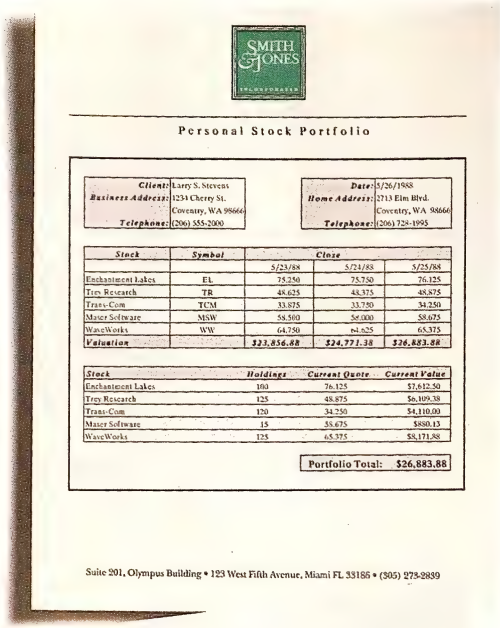
Don't waste any more time, or paper. Preview your ideas before you print them out.



As you can see, Microsoft can make all kinds of HP printers and plotters look their best.

Personalize your LaserJet Series II Printer with HP fonts and memory boards.

These documents were brought to you by Microsoft Excel, Microsoft Windows, and the HP LaserJet Series II, PaintJet and DeskJet printers.



SMITH & JONES

Personal Stock Portfolio

Client: Larry S. Stevens *Business Address:* 1234 Cherry St. Coventry, WA 98666 *Telephone:* (206) 555-2000	*Date:* 5/26/1988 *Home Address:* 2713 Elm Blvd. Coventry, WA 98666 *Telephone:* (206) 728-1995

Stock	*Symbol*	*Close*		
		5/23/88	5/24/88	5/25/88
Enchantment Lakes	EL	75.250	75.750	76.125
Trey Research	TR	48.625	48.375	48.875
Trans-Com	TCM	33.875	33.750	34.250
Maier Software	MSW	58.500	56.000	58.675
WaveWorks	WW	64.750	64.625	65.375
Valuation		*$23,856.88*	*$24,771.38*	*$26,883.88*

Stock	*Holdings*	*Current Quote*	*Current Value*
Enchantment Lakes	100	76.125	$7,612.50
Trey Research	125	48.875	$6,109.38
Trans-Com	120	34.250	$4,110.00
Maier Software	15	55.675	$880.13
WaveWorks	125	65.375	$8,171.88

Portfolio Total: $26,883.88

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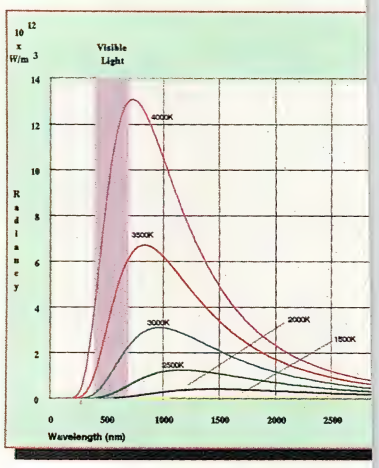
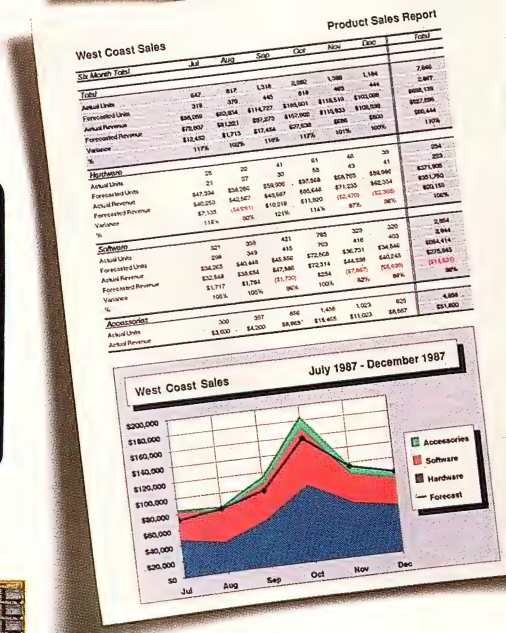
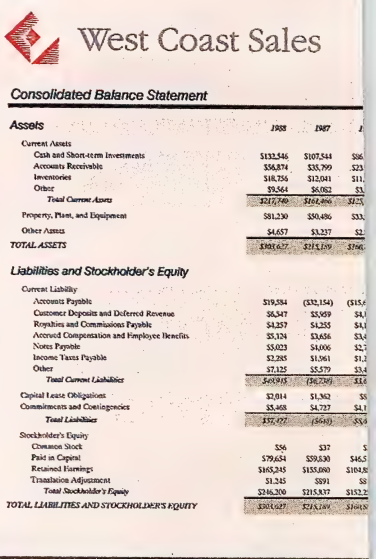




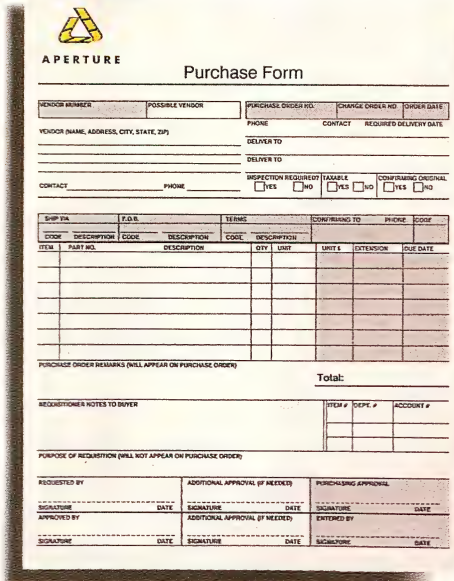


West Coast Sales

Consolidated Balance Statement

Assets	*1988*	*1987*
Current Assets		
Cash and Short-term Investments	$132,546	$107,544
Accounts Receivable	$56,874	$35,799
Inventories	$18,756	$12,041
Other	$9,564	$6,082
Total Current Assets	*$217,740*	*$162,466*
Property, Plant, and Equipment	$81,230	$50,486
Other Assets	$4,657	$3,237
TOTAL ASSETS	*$303,627*	*$216,189*

Liabilities and Stockholder's Equity		
Current Liability		
Accounts Payable	$19,584	($32,154)
Customer Deposits and Deferred Revenue	$6,347	$5,959
Royalties and Commissions Payable	$4,257	$4,255
Accrued Compensation and Employee Benefits	$5,324	$3,656
Notes Payable	$5,023	$4,006
Income Taxes Payable	$2,285	$1,961
Other	$7,125	$5,579
Total Current Liabilities	*$49,945*	*($41,749)*
Capital Lease Obligations	$2,014	$1,362
Commitments and Contingencies	$5,468	$4,727
Total Liabilities	*$57,427*	*($43,)*
Stockholder's Equity		
Common Stock	$36	$37
Paid in Capital	$79,654	$39,830
Retained Earnings	$165,245	$155,680
Translation Adjustment	$1,245	$891
Total Stockholder's Equity	*$246,200*	*$215,837*
TOTAL LIABILITIES AND STOCKHOLDER'S EQUITY	*$303,627*	*$216,189*



APERTURE

Purchase Form

VENDOR NUMBER	POSSIBLE VENDOR	PURCHASE ORDER NO.	CHANGE ORDER NO.	ORDER DATE
		PHONE	CONTACT	REQUIRED DELIVERY DATE

VENDOR (NAME, ADDRESS, CITY, STATE, ZIP)

DELIVER TO

DELIVER TO

CONTACT _____ PHONE _____

INSPECTION REQUIRED? ☐ YES ☐ NO | TAXABLE ☐ YES ☐ NO | CONFIRMING ORIGINAL ☐ YES ☐ NO

SHIP VIA	F.O.B.	TERMS	CONFIRMING TO	PHONE	CODE
CODE / DESCRIPTION	CODE / DESCRIPTION	CODE / DESCRIPTION			

ITEM	PART NO.	DESCRIPTION	QTY	UNIT	UNIT $	EXTENSION	DUE DATE

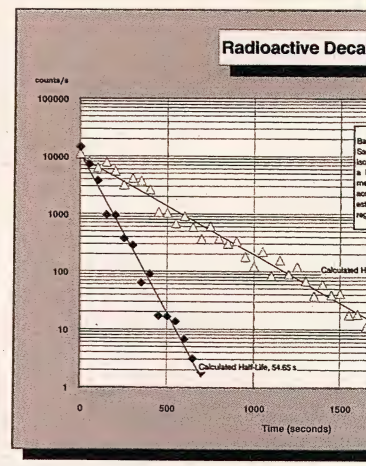
PURCHASE ORDER REMARKS (WILL APPEAR ON PURCHASE ORDER)

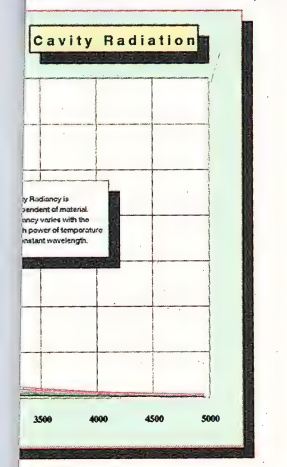
Total:

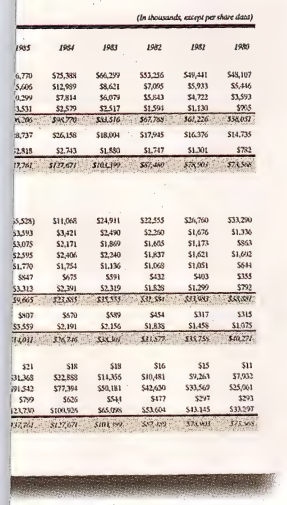
REQUISITIONER NOTES TO BUYER | ITEM # | DEPT. # | ACCOUNT #

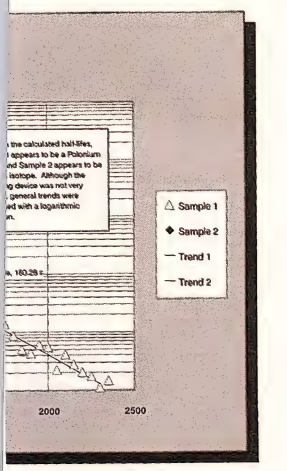
PURPOSE OF REQUISITION (WILL NOT APPEAR ON PURCHASE ORDER)

REQUESTED BY	ADDITIONAL APPROVAL (IF NEEDED)	PURCHASING APPROVAL
SIGNATURE / DATE	SIGNATURE / DATE	SIGNATURE / DATE
APPROVED BY	ADDITIONAL APPROVAL (IF NEEDED)	ENTERED BY
SIGNATURE / DATE	SIGNATURE / DATE	SIGNATURE / DATE









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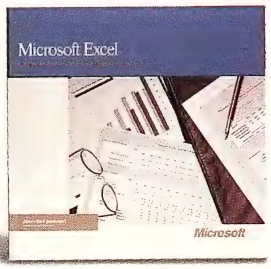

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Laptops of Luxury

NEC aims for another MultiSpeed-like splash with the high-end ProSpeed 80286 and 80386 laptops. But the tiny UltraLite may make the biggest waves.

Eric Knorr

People who need a laptop fall into two camps: those seeking a box with enough power to replace their desktop computer, and those who want the least obtrusive, most mobile PC they can find. With the ProSpeed and UltraLite laptops, NEC Home Electronics is courting both groups.

The clamshell-style ProSpeed, which comes in both 80286 and 80386 models, is a desktop to go. Weighing in at 18 pounds without the optional 3-pound battery, each model offers an EGA-compatible backlit LCD, a 1.44MB 3½-inch floppy drive, 16-MHz operation, and enough options to give a Compaq lunch box a run for its money. The UltraLite, on the other hand, is the size of a notebook and weighs less than 4½ pounds—literally the smallest, lightest PC compatible available with a full 25-line display.

PC World previews are informal assessments of products that at press time were still in the development stage. Complete reviews—including features evaluations and performance testing—will appear only after a product is officially released.

Muscle in a Clamshell

NEC is pushing its pair of ProSpeeds—not just as road warriors but as all the PC you'll ever need. The ProSpeed 80386 comes with 2MB of 32-bit RAM (expandable to 10MB) and a 29ms 40MB hard drive with a 64K cache controller. Also standard are a VGA port, an 80387 coprocessor socket, a 91-key PS/2-style keyboard (minus the second cursor keypad), one serial and one parallel port, DOS 3.30, and IGC's *VM/386* multitasking environment.

NEC expects to sell this starting configuration for between $7000 and $7500. A whopping 100MB internal hard disk with a 25ms average access time will also be available, and a proprietary 16-bit expansion slot will accommodate as-yet-undisclosed options.

MICHAEL JAY

NEC's ProSpeed 386 and desktop docking station (left) are a powerhouse team; at right, the tiny UltraLite.

The ProSpeed 80386's most unusual feature is its optional deskbound "docking station." More than just an expansion box, the docking station provides its own 200-watt power supply along with three full-size 8/16-bit expansion slots, one full-size 8-bit slot, and two 5¼-inch half-height drive bays.

When you return from the road, you simply slide the ProSpeed 80386's 120-pin connector into the docking bay—no muss, no fuss. The clamshell automatically switches to the docking station's AC power, a second CONFIG.SYS file kicks in to handle your desktop options, and ports on the rear of the desktop box duplicate the functions of those on the ProSpeed. The docking bay also adds a second se-

rial port and a switchable AC socket for a VGA monitor.

The deskbound unit for the ProSpeed 80286 seems more like a garden-variety expansion box. The 80286 model is scaled back in other respects. It comes with 1MB of RAM (expandable to 5MB) and a 27ms 20MB hard disk; as with the ProSpeed 386, the 2400-bps modem is a $599 extra. NEC representatives aver that the ProSpeed 80286's asking price will be between $5000 and $6000.

One of the most impressive features of both ProSpeeds is a detachable 5½-by-9-inch display, one of the first EGA-compatible LCDs available. The so-called "compensated" twisted nematic display offers excellent light absorption, while the fluorescent backlighting is exceptionally bright and even. The upshot is that this backlit LCD is truly black and white, with first-rate contrast.

The backlighting on both units powers down automatically after a period of keyboard inactivity. That's good, because a charge lasts an average of only 2 to 3 hours. The battery is external and covers all the ports on the back of the unit, so battery operation was clearly an afterthought.

Born to Get Lost

While the ProSpeeds have the muscle, the UltraLite seems guaranteed to get the most oohs and aahs. Less bulky even than Tandy's TRS Model 100, the 1.4-by-8.3-by-11.75-inch UltraLite centers on a NEC V30 running at 9.54 MHz—the same CPU as the NEC MultiSpeed's. For $3000, you get 640K of RAM, a 1MB dedicated RAM disk (upgradable to 2MB), a NiCad battery, a 2400-bps modem, an AC adapter, and a built-in serial port. The display is a pleasant backlit supertwist LCD with CGA resolution, similar to that offered by the MultiSpeed HD. As with the ProSpeed display, the backlighting times out automatically.

Although full size, the UltraLite's keyboard might take some getting used to. The keys are nearly flat, and though they're responsive, they sink only slightly when you press them. Nonetheless, the layout is sensible: 12 small function keys line the top, and when you press the special <Fn> key, the four arrow keys on the inverted T cursor pad double as <Page Up>, <Page Down>, <Home>, and <End>.

One UltraLite ace in the hole—or more accurately, card in the slot—is a selection of ROM-based options. To begin with, DOS 3.30, *Lap-Link*, and a DOS shell are burned into system ROM, which is treated as drive D:. More interesting are the other ROM-based applications, each of which is sealed in a credit-card–size package.

Pop off a plastic door, and the ROM card slips into a slot on the side of the UltraLite, which treats this receptacle as drive B: (the RAM disk is drive C:). NEC has ROM cards showing for *Crosstalk Mk.4*, *1-2-3* release 2, *WordPerfect 5.0*, *Microsoft Works*, and *XyWrite III;* other applications are reportedly in the works.

Drive A: is an optional 3½-inch bootable external drive. It requires the UltraLite's AC adapter and offers the only way to get data on and off the machine, aside from a modem or null-modem link. Outfitted with a parallel port, the external drive is also the sole way to talk to a parallel printer.

Battery operation is the UltraLite's weakest link; a full charge, as with the ProSpeeds, lasts for only 2 to 3 hours. In its favor, the UltraLite provides a clever four-LED "gas gauge" that tracks battery charging. The LEDs are otherwise unlit, but press a button and they tell you how much juice is left.

Rarely does a company aggressively target both the high and low ends of a market at the same time. Whether NEC hits the right note on the high end with the bulky but powerful ProSpeeds 80386 and 80286, the UltraLite seems sure to strike a chord with users dying for a laptop that *really* fits in a briefcase. ●

Eric Knorr is a senior editor for PC World.

SNAPSHOT

ProSpeed 80386, ProSpeed 80286, UltraLite

NEC Home Electronics is targeting both ends of the laptop spectrum with powerful but hefty 80386- and 80286-based ProSpeed models and an extremely compact battery-powered UltraLite unit.

KEY FEATURES

- **Deskbound "docking station" for ProSpeed 80386 offers heavy-duty power supply, four expansion slots, and two disk bays**
- **Optional 25ms 100MB internal hard disk for ProSpeed 80386**
- **EGA-compatible ProSpeed LCD with "compensated" twisted nematic design offers excellent screen quality**
- **UltraLite places DOS 3.30, *Lap-Link*, and a DOS shell in ROM and supports ROM cards for *Crosstalk Mk.4*, *1-2-3* release 2, *WordPerfect 5.0*, *Microsoft Works*, and *XyWrite III***

AVAILABILITY

ProSpeed 80386 and UltraLite in November 1988, ProSpeed 80286 in February 1989

PRICING

Starting configurations, only estimated at press time: $7000 to $7500 for ProSpeed 80386, $5000 to $6000 for ProSpeed 80286, $3000 for UltraLite

NEC Home Electronics
1255 Michael Dr.
Wood Dale, IL 60191
312/860-9500

Reader service number 680

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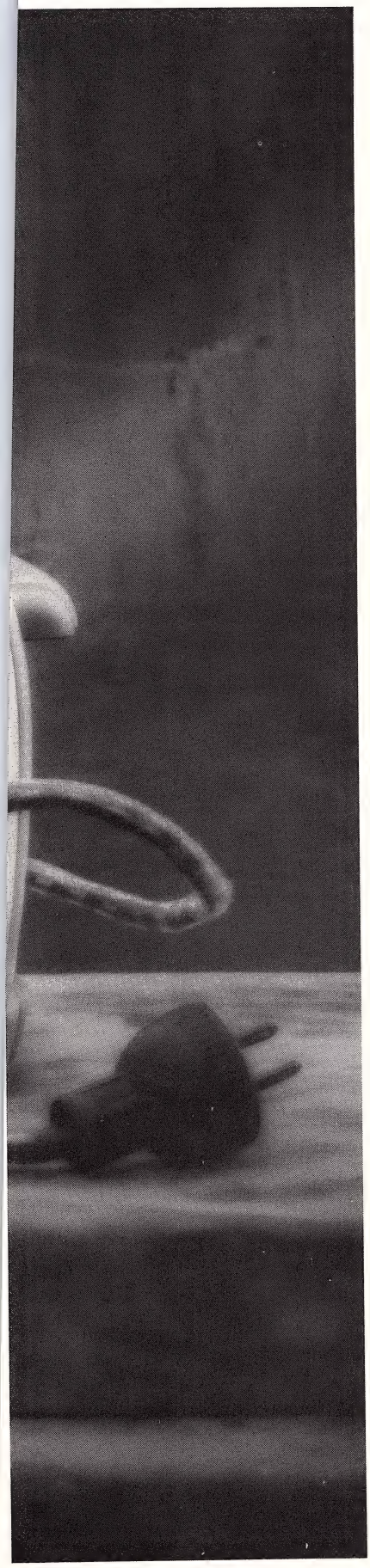

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Practical Compatibles.

Is Smaller Better?

Can a laptop be your only computer? With Compaq's SLT 286, the answer is a definite "maybe."

Richard Landry and Karl Koessel

Ever since Alan Kay envisioned Dynabook —the perfect portable— vendors have labored to create the smallest, lightest, most powerful and expandable system possible—with the best screen and the longest battery life. NEC, Toshiba, Zenith, and others have offered products that make various trade-offs between performance and portability (see the preview "Laptops of Luxury" in this issue). Moving from lunch box to laptop, Compaq waited for the technology needed to create the ultimate 286 design—a lightweight, full-function, OS/2-compatible, no-compromise portable.

The result is the SLT 286, which parallels the Deskpro 286 and Portable III in price and performance while delivering the sharpest laptop screen currently available. Weighing in at just under 14 pounds, the SLT 286 features a 12-MHz Harris CMOS 80286 processor operating at one wait state. The built-in VGA gives the 10-inch, backlit, fluorescent, supertwist LCD screen up to 8 shades of gray at 640 by 480. The SLT 286's display is thus both rich and soothing to the eyes—and when was the last time you could say *that* about a laptop screen?

Compaq's first laptop, the svelte SLT 286, easily slips in and out of the optional Desktop Expansion Base.

The sleek, compact SLT 286 houses one 3½-inch floppy drive and a fast 20MB or 40MB hard drive. Both drives rate a 29ms average access time, but the 40MB model gets a performance boost from its 1:1 interleave ratio. The standard configuration also features a serial port, a parallel port, a

socket for a 12-MHz 802C87 math coprocessor, and interfaces for an external VGA monitor, an enhanced keyboard, a separate numeric keypad, and an internal 2400-bps Hayes-compatible modem or a second serial port.

The SLT 286 comes standard with 640K of RAM, expandable to 3.64MB with 1MB memory cards that easily snap into the system. Support for EMS 3.2 is built in.

So light that it feels somewhat flimsy, and missing a separate numeric keypad, the detachable keyboard nevertheless has a nice touch that compares favorably with the standard Compaq keyboard. The keyboard stows into a shallow recess on the top of the unit, concealing the bay for a drop-in NiCad battery that provides up to 3 hours of power. The battery gets help from a power conservation system that shuts down the screen and hard disk when they are inactive for a user-specified period of time. You can also put the laptop in limbo temporarily by pressing a standby button, so you can restart it without having to reload your applications. The system includes a lightweight AC adapter.

What's the tariff for this ride? At press time, the Model 20 was slated to retail for $5399, the Model 40 for $5999. The comparable Portable III Models 20 and 40 retail for $4999 and $5799, respectively, while the Deskpro 286 Models 20 and 40 go for $3599 and $4199.

Computing à la Carte

Memory aside, the SLT 286 isn't short on expansion options. To keep prices from skyrocketing, Compaq has adopted a modular approach that lets you add options incrementally. For example, you can supplement the unit's keyboard with an external numeric keypad, and you can enhance storage capacity with an external storage module that holds a 5¼-inch floppy disk drive or a 40MB tape backup unit. A switch enables you to boot the system from the floppy drive.

If you simply want to add a full-size keyboard and a VGA color monitor, you don't require any additional options. But if you need to use a network card, for example, a desktop expansion base provides two full-size 8/16-bit slots, and its own power supply, along with parallel, keyboard, and display ports that duplicate the functionality of the laptop. The SLT 286 simply slides into this base and can immediately access any devices connected to it. At press time, prices were not set for the external numeric keypad, storage module, or expansion base.

Unfortunately, this à la carte approach penalizes those who want the SLT 286 to be their one and only computer. If you need to supplement the system's storage capacity with both a 40MB tape backup unit and a 5¼-inch floppy drive, then you'll need not one but two external storage modules, but you can use only one at a time. If you want fur-

The Deskpro 386/20E appears identical to the Deskpro 386S but packs 20 MHz of full 32-bit power inside.

TONY CARLSON

SNAPSHOT

Compaq SLT 286, Compaq 386/20E

Designed to fill the bill for both travel and office, Compaq's first laptop features a 12-MHz 286 chip, a VGA screen, and powerful expansion capabilities.

KEY FEATURES

- **Backlit, supertwist LCD display offering 640 by 480 resolution with eight levels of gray**
- **29ms 20MB or 40MB internal hard disk**
- **Expansion base with room for two full-size 8- or 16-bit expansion boards**

AVAILABILITY

immediate

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Houston, TX 77070
713/370-0670

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ther hard disk expansion, you must invest in the desktop expansion base and either the fixed disk drive expansion unit designed for Compaq desktops or a hard disk card. All in all, you could end up with a system that sprawls across your desk.

Michael Swavely, Compaq's vice president of sales and marketing, states that upcoming products will incorporate further improvements in size and weight as well as in processor, hard drive, display, and power technology. A 386 laptop would certainly qualify as the ideal all-in-one computer. In the meantime, the SLT 286 looks like an attractive alternative to a 286 desktop for users who want to take their data with them.

20 MHz and Shrinking

Compaq is thinking small even on the desktop, offering a trimmed-down version of its 20-MHz 80386 system and discontinuing two larger 386 models.

The Deskpro 386/20E sports the small footprint and new styling pioneered by the Deskpro 386S but goes one better by integrating 16-bit VGA graphics directly on the motherboard instead of on a piggyback card. Like its now-defunct brother the Deskpro 386/20, the 386/20E gets a lift from an 82385 cache controller paired with 32K of 35ns RAM and an optional 80387 or Weitek coprocessor. The unit comes with 1MB of 32-bit RAM expandable to 16MB on a board plugged into its high-speed memory slot. Compaq offers this board in both 1MB and 4MB options, with expansion through 1MB or 4MB memory modules.

Like the diminutive 386S, the 386/20E includes four 8/16-bit expansion slots; serial, parallel, and mouse ports; a 5¼-inch, 1.2MB drive; and room for three additional half-height devices. You can get up to 220MB of storage by installing two 110MB hard disks. Compaq offers the 386/20E Model 1 with a single 1.2MB drive for $5199. The Model 40 includes a 29ms 40MB hard drive for $6599; the Model 110, with a 25ms 110MB drive, goes for $7999. Both hard drives feature a 1:1 interleave. Compaq also has upgraded its disk-caching software. All models are available now.

Gone with the Deskpro 386/20 is the 16-MHz Deskpro 386 (the world's first 80386 machine to ship in volume), leaving only the Deskpro 286 and the Deskpro 386/25 in traditional Compaq livery. Swavely says Compaq will continue to move its line to the trimmer design. New high-end offerings will appear first in the larger size, but customers who wait awhile will get the same power—writ small.

Richard Landry is PC World's *editor in chief, and Karl Koessel is the technical editor.*

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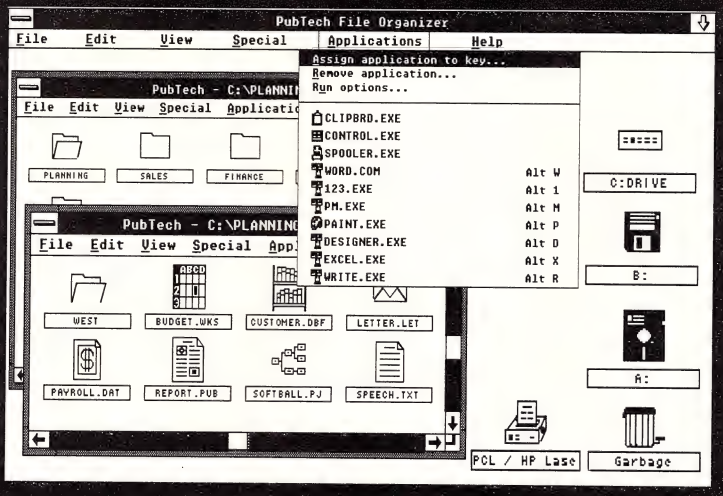

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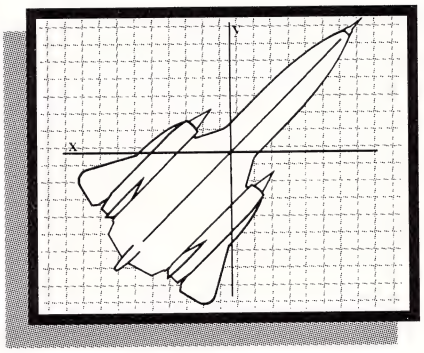

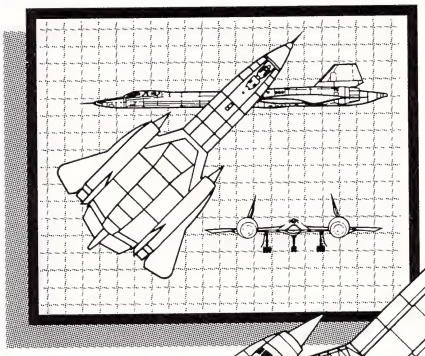

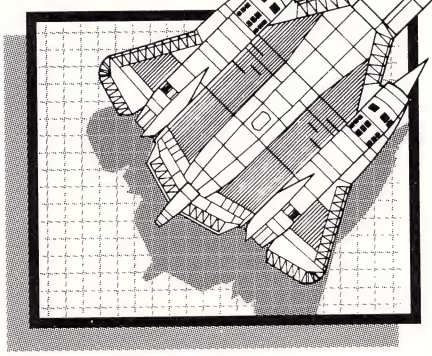

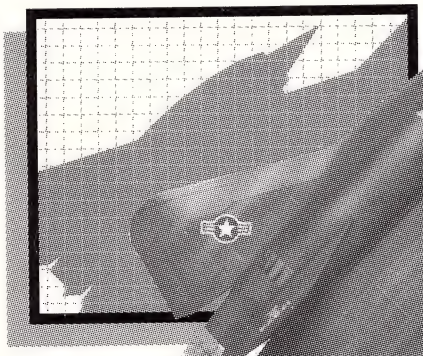

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In fact, the HeadStart III™ is truly OS/2 ready. You can add two full megabytes of RAM without having to buy any additional boards.

For more information about the HeadStart III™ and our full line of advanced computer systems, or to find the nearest dealer, call toll-free **1-800-882-1888.** Can you think of a reason not to?

Value. Going beyond DOS which is of course standard, an unprecedented package of 14 name brand programs worth thousands of dollars are included FREE with your HeadStart III™.

Support. Our P.C. COACH, nationwide toll-free hotline is available free to registered owners.

SPECIFICATIONS

MICROPROCESSOR: Intel 80286-12
SPEED: 12MHz/8 Switchable
BIOS: Award
BUILT IN RAM: 1 Megabyte
EXPANDABLE TO: 3 megabytes
POWER SUPPLY: 145 watts 110/220 switchable
KEYBOARD: 101 key PS/2 compatible
GRAPHICS: VGA Autosync
FLOPPY DRIVES: one 5.25" 1.2 megabyte, one 3.5" 1.44 megabyte
HARD DRIVE: 32.1 megabyte, 28 milliseconds, 1:1 interleave
BUILT IN INTERFACES: Parallel, 2- RS232 serial, mouse, joystick
EXPANSION SLOTS: 3 available
MOUSE: Standard
SOFTWARE: DOS 3.3, GW Basic, HeadStart Advanced Environment, Floppy Driver, Framework II, 3-D Graphics, ATI and Computer-EEZ Tutorial Software, Xtree hard disk manager, Publish-it! Chessmaster 2000, Splash VGA paint program, Bookmark, plus Twist and Shout.

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PRODUCT OUTLOOK

104 PRODUCT OUTLOOK

SuperCalc 5
The granddaddy of spreadsheets greets the new generation, adding worksheet consolidation, selective recalc, and more.

Connection CoProcessor
PC-based communications gets a big boost with this combination fax/modem board and 80188 CPU.

Opus I
Link graphics to data base records, text, or other graphics with this powerful *Microsoft Windows*-based drawing program cum data base.

Smalltalk/V 286
Cheaper and easier than OS/2, this object-oriented programming environment for 80286- and 80386-based computers addresses more memory and delivers multitasking and a graphic user interface.

MapInfo
Turn your data base files into maps that let you analyze the data and create presentations.

TASK-force
Pare down billing and accounting chores with an all-in-one small-business-management program.

Paragon 286V
Clever design packs advanced features, VGA graphics, and lots of free slots into a small system.

112 BRIEFLY NOTED

3000 NL, 1000 TL, 1000 SL
Tandy boosts the performance of its most popular 80286-based machines by up to 30 percent and upgrades two low-end PCs.

Who/What/When Office
Schedule people and resources on your network and then view the info three ways.

Extend-A-Name
Break the DOS 8-character limit for naming files with this memory-resident product.

Battery Watch
Laptop users: If running on empty isn't your style, this utility checks your batteries every 2 seconds to let you know when you're getting low.

Microsoft Word Companion Disk
Peter Rinearson's one-man crisis intervention team for *Word 4.0* users includes over 300 macros, a slew of style sheets, and more.

OPTune
Like a private mechanic for your hard disk, this program keeps your disk in top shape.

EFAX-88
A portable fax machine that transmits hard-copy information at a decent rate without errors.

386 MotherBoard/AT
Transform your AT or compatible into an 80386 with Hauppauge's motherboard upgrade.

120 UPDATE

Harvard Project Manager 3.0
First-time users of Software Publishing's project planner can get to work within minutes, thanks to new fast-tracking and outlining capabilities.

DeskJet Landscape Upgrade Cartridge
Print spreadsheets and tables sideways and expand your font repertoire with a pair of cartridges from Hewlett-Packard.

Foxbase+ 2.10
Customizable templates bundled with this data base manager let you produce applications, paint screens, and compile code.

Actor 1.2
An object-oriented programming language whose turf is *Windows* and expanded memory.

Turnkey 3.1, Turnkey 3.1 Menu Builder's Version
Optimal Solutions updates its easy menu-building utility with a *1-2-3*-like interface and adds a developer's version that lets you create fast-running menus for others in your work group.

Accpac Plus Windowing System Manager, LanPak
Improved windowing and LAN modules give this accounting package greater macro muscle, enhanced search power, and more.

Media Master 5.0
Format CP/M, DOS, and TurboDOS disks for easy swapping among incompatible systems.

Designer 1.2
Windows desktop publishers can build palettes from a rainbow of 16 million colors.

News you can use about PC product announcements and upcoming releases

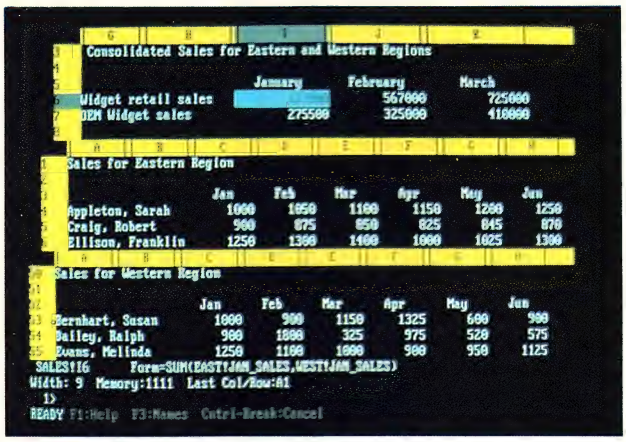
Mike Hogan

SuperCalc 5

SuperCalc, The Sequel

The latest episode in the *SuperCalc* saga fast-forwards to the future of spreadsheet-based business modeling, bringing users many of the most frequently asked for features in the genre, including worksheet consolidation and selective recalculation. But *SuperCalc 5*, whose roots are planted firmly in the origins of personal computing, hasn't forgotten the million or so users who have taken it this far. The new *SuperCalc* maintains complete file compatibility with previous versions, the earliest of which may even now be chugging away on an old CP/M machine somewhere in your company.

SuperCalc 5 will play on any stage, whether it's a full-featured 80386 platform or a two-floppy PC—a definite plus for worksheet consolidation. Now you can integrate the monthly or annual budgets of the many departments or divisions in your company by hot-linking crucial cells (like those containing totals) with the appropriate cells in a master worksheet; the critical cells need not be in the same locations in their respective worksheets. And, figuring the daily consolidated receivables for a company with multiple departments is no longer a forbidding chore.



SuperCalc 5 consolidates worksheets, does selective recalc, and supplies many other popular spreadsheet-modeling features without abandoning the estimated 1 million users of prior versions.

SuperCalc 5 also reads *1-2-3* .WKS and .WK1 files as well as executing Lotus macros, for those in your organization enamored of the other major player in the market. And should die-hard Lotus aficionados want to share your work, you can output in .WKS format or even hot-link to their worksheets.

The new release makes a second bow to flexibility and to *1-2-3* by letting you choose either *SuperCalc 5* or Lotus-style menus; you can even toggle between them using slash commands. If you like, embed the toggle in *1-2-3* macros to perform *SuperCalc* commands not found in *1-2-3*.

SuperCalc's latest incarnation serves up dozens of different graph treatments with variable colors, 3-D pies and bars, and interactive links to the range that created them. Its forms-creating capability offers grids, lines, and shading of such quality that you can create a 1040 form that looks just like the one Uncle Sam sends. Desktop publishers can move easily from spreadsheet to annual report by hooking up to a phototypesetter or a 35mm slide maker.

More news in the compatibility arena: *SuperCalc 5* cooperates with Computer Associates' add-in data base manager, *Silverado*. Sparse-matrix memory management means that you pay the price in RAM only for those cells that actually contain data; recalcs are faster because *SuperCalc 5* operates on only those cells affected by a numerical change. The program skips over labels, unaffected formulas, and other irrelevancies. An undo command saves you from ill-placed keystrokes.

SuperCalc 5, which lists for $495, requires DOS 3.00 or a later version and 512K of memory. Upgrades are free to Computer Associates' SupportPlus maintenance plan members who are caught up on their $150 annual dues. If you bought *SuperCalc 4* after May 23, 1988, send in your registration card for a $100 refund and a copy of *SuperCalc 5*. Others must pay $100. Computer Associates Int'l, 1240 McKay Dr., San Jose, CA 95131; 800/531-5236.
Reader service number 740

Connection CoProcessor

Fast Talk

For all the chatter about multitasking, the PC is still a sequential device that, if human, couldn't walk and chew gum at the same time. Some clever control programs, like Quarterdeck's *Desqview*, are able to divide the processor's time between two or more applications and, by quickly switching between them, make it appear that they are running simultaneously. But to truly multitask, two brains are definitely better than one.

A second processor really pays off in the increasingly important area of PC-based communications, which is why the Intel Personal Computer Enhancement Operation equipped its new all-in-one communications board with a speedy 10-MHz 80188 CPU, backed up by 256K of memory. The Connection CoProcessor is a fax/modem combo that lets you spread out your spreadsheet or rummage

through your data base in the foreground while it sends and receives fax messages, data files, or even programs over phone lines in the background.

This single-slot board will route group 3 faxes at 9600 bps to and from fax machines or similarly equipped computers. A Hayes-compatible daughterboard modem lets you send data files and even binary files, such as programs, at 2400 bps to other PCs or E-mail and bulletin board services.

You won't have to wrestle with baud rates, stop bits, and other telecommunications trivia every time you want to communicate, because the Connection CoProcessor lets you script and store the parameters for your sessions. To use the Connection CoProcessor, you only need to know *who* and *what*. Its point-and-shoot interface makes it easy to select the what from a hard disk file directory and the who from your personal directory. Or, you can enter the information from the command line. The Connection CoProcessor forwards files, faxes, and E-mail to distribution lists as large as 999 names.

Intel says the Connection CoProcessor is just the first of a family of products that will support the DCA/Intel Communicating Applications Specification (CAS), jointly developed by Intel and Digital Communications Associates. CAS is a communications interface standard that will let applications programmers add transparent but limited communications functions to word processing, spreadsheet, and other standard programs. It won't give these applications the scripting and interactive capabilities of full-blown communications packages, but it does support some batch-mode functions.

The Connection CoProcessor is $995; the optional modem is $295. Intel Personal Computer Enhancement Operation, 5200 N.E. Elam Pkwy., Hillsboro, OR 97124-6497; 800/538-3373.

Reader service number 741

Opus I

The Picture File

No file is an island, which is why spreadsheets, data bases, and word processors give us several indispensable ways to connect words and numbers. Pictures are a tougher proposition, though, since there seems to be no logical way to connect their parts.

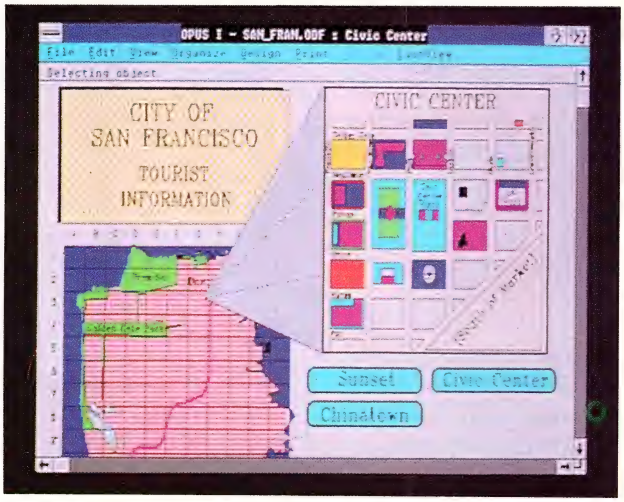
Now, taking a cue from Apple's HyperCard, Roykore Software has married a powerful drawing program to a data base under the *Microsoft Windows* environment, so your desktop publishing drawings and CAD files needn't remain strangers. Using *Opus I*'s "hyperdrawing" technique, you can link all or part of a graphic to other similar or dissimilar graphics as well as to data base records and text in a nonrelational fashion.

Windows' pulldown menus and dynamic data exchange make such linkage as easy as pointing—first to an object in your drawing, and then to a record in an accompanying text file. A tap on the <Enter> key or a click of the mouse makes your connection. When you want to call up another picture or record, you point to a linked portion of your graphic and click on it again.

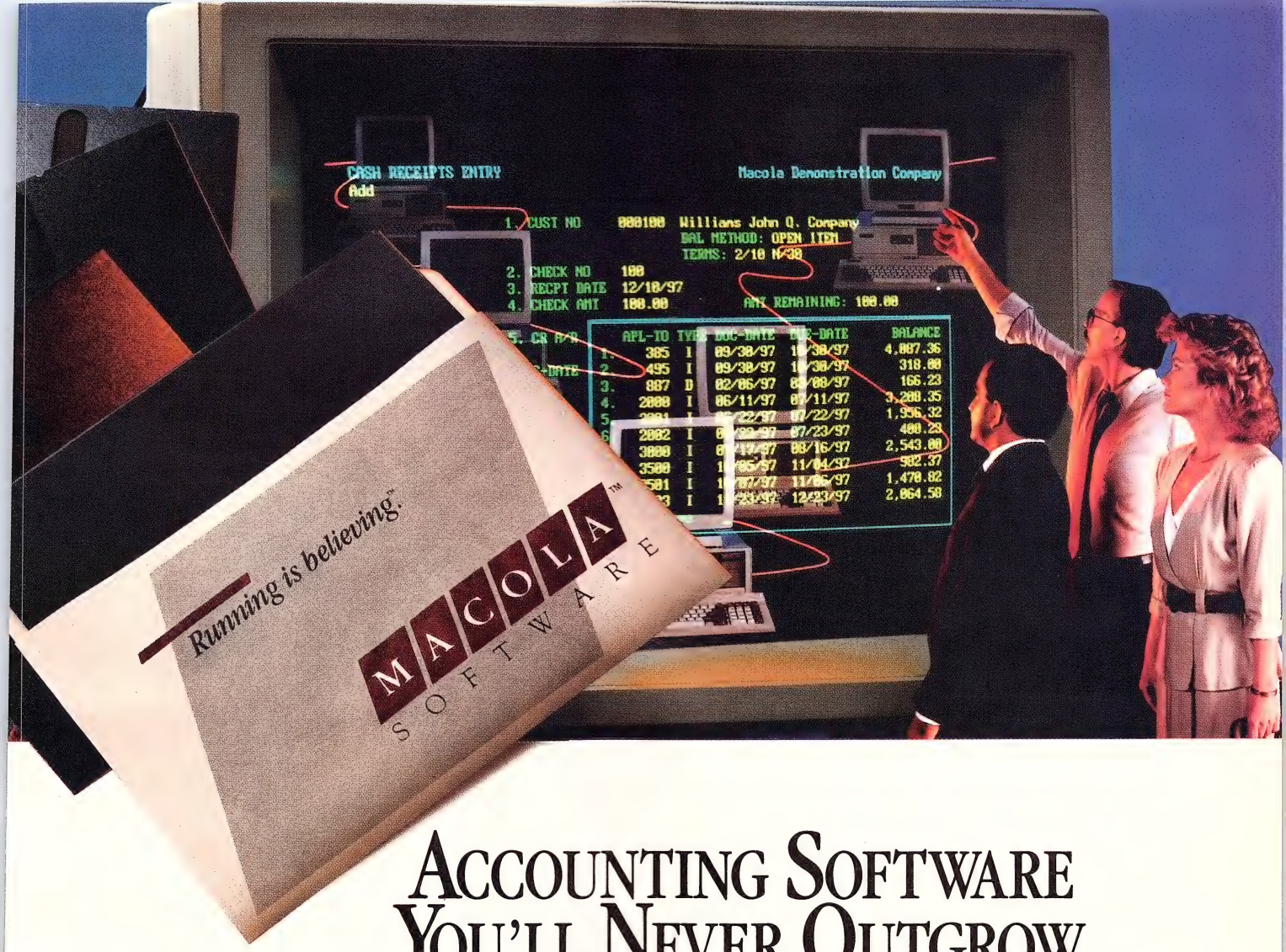
A complete drawing program, *Opus I* lets you create your own drawings using object-oriented tools ranging from straight lines to polygons and ellipses. You can choose from 40 patterns, 8 colors, and 10 line styles, and you can add text in a variety of typefaces. You can even create objects from bit maps of scanned photos, then trace and edit them to your liking.

Applications for *Opus I* go far beyond manipulating and cataloging graphics files. A flat-file manager, *Opus I* allows you to link just about any sort of information—text, numbers, dates—to your drawing. For example, you can manage a company's sales offices by linking up a number of images that show the different sales regions. By pointing the cursor at part of an image—say, a symbol representing an office location—you can call up further information, such as sales figures, personnel data, or a floor plan. You can even create maps that let you zoom to specific neighborhoods or streets for further detail.

You can transfer information between *Opus I* and other data bases using ASCII or DIF formats. The $395 program, which includes a run-time version of *Windows 2.0*, requires DOS 3.00 or a later version, 512K of memory, and a hard disk drive, as well as a CGA, EGA, Hercules, or compatible graphics adapter.



Taking a cue from hypertext on the Macintosh, Roykore Software has combined a powerful drawing program with a data base under the Microsoft Windows environment. You can link all or portions of your graphics files to others as well as to data base records with Opus I's flat-file manager.



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A mouse is recommended. Roykore Software Inc., 749 Brunswick St., San Francisco, CA 94112; 415/333-7833.
Reader service number 742

Smalltalk/V 286

Paint Up, Fix Up

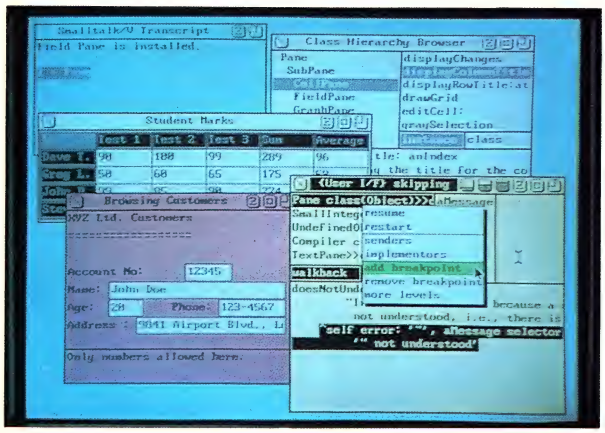
Computer industry superpowers are pulling together to revolutionize the operating system platform on which PC applications are based. OS/2 is nothing less than a floor-to-ceiling renovation of the current programming environment. Look forward to a far more robust, if more expensive, operating environment.

But just as with home remodeling, many smaller companies are finding more economical ways to offer increased memory addressability, multitasking, and a graphic user interface. Digitalk, for example, has introduced *Smalltalk/V 286*, an object-oriented programming environment for 80286- and 80386-based computers that offers in-house and commercial application developers a form of multitasking, as well as the ability to address large memory blocks. Running under DOS, *Smalltalk/V 286* takes advantage of the protected mode of the 286 and 386 chips to address up to 16MB of extended memory directly. You can develop controlled applications for multiple, simultaneous processes—sorting a data base in the foreground, for example, while communications are conducted in the background.

Unlike those that run under OS/2, *Smalltalk/V 286*–based applications will not interact with programs written in other languages. Each process is restricted to its own reserved memory space and must queue up for processor time based on its relative importance to other processes competing for the CPU at a given instant. But since all this happens in the blink of an eye, it *appears* as though all of these applications run simultaneously.

Because it's an object-oriented language, rather than a logical or procedural one, *Smalltalk/V 286* applications are relatively simple in design. Such a language is better for creating a graphic interface. Programming is as easy as linking objects in point-and-shoot fashion; within the graphic, windowed environment, you can browse and select from different classes of programmable objects such as windows or pull-down menus. *Smalltalk* applications are very portable across different microprocessors: Your *Smalltalk/V 286* applications need only be recompiled to run under *Smalltalk/V*, for the 8088 processor, or under *Macintosh Smalltalk/V*.

Smalltalk/V 286, which requires DOS 2.00 or a later version, retails for $199.95. It comes with a windowed development environment, a language, and a powerful debugger. A disk-browser window gives you access to most DOS commands, while a library provides more than 200 classes of useful application building blocks such as those for windows and menus. A paint program lets you include bit maps in applications, and a clipboard makes it easy to move objects between *Smalltalk's* windows. Extension kits for color and communications drivers cost $49.95 each. Digitalk, Inc., 9841 Airport Blvd., Los Angeles, CA 90045; 800/922-8255, 213/645-1082.
Reader service number 743



An easy-to-use, object-oriented programming language for in-house and commercial programmers, Smalltalk/V 286 lets you multitask and address up to 16MB of memory in the protected mode of 80286- and 80386-based computers.

MapInfo

Lay of the Land

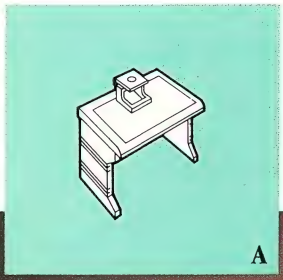
You can work numerical wonders with a spreadsheet, but when it's time to make sense out of all those numbers, a graph can be even more wondrous. Similarly, data bases can swamp you with records and leave you without a way to chart a clear path through them. But now Mapping Information Systems lets you turn all those names, addresses, and notes into one or more maps with *MapInfo*.

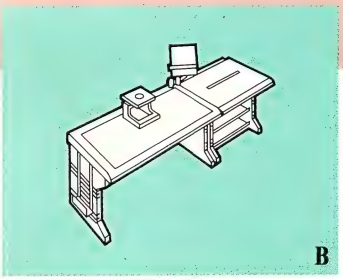
Designed to be used as both a presentation package and a data analysis tool, *MapInfo* is built around a data base that uses *dBASE* file formats. You can enter your own data or import *dBASE III Plus* native files, as well as those from other data bases in ASCII format.

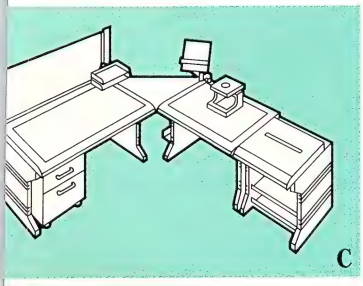
You then view that information in a variety of meaningful ways. For example, you can map your sales leads, office sites, or subscribers by region, state, city, or even more targeted geographic parameters, and use those distribution maps for sales analysis or as presentation aids. *MapInfo* automatically creates *pin maps*, whose on-screen points are as specific as street addresses, as well as *thematic maps*, which highlight user-defined regions using color, shading, and borders to define service area boundaries or delivery zones.

Use *MapInfo* to create road maps for your sales or delivery personnel. Po-

Right, it's efficient.
Right, it's great looking.
Costs an arm and a leg, right?







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Breakthrough prices. The basic workstation (drawing A) costs less than $275. For under $580, you can set up the intermediate workstation (drawing B). And the full featured workstation (drawing C and photo) is less than $1195. Since the WorkManager™ System is modular, you can start small and add on as your needs—and resources—grow.

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lice departments could use the program to track crime sites, fire departments could pinpoint neighborhood fire hazards, and retail chains could use it to describe market areas around store locations. Points on each map are accurate to within 60 feet and can be viewed from the perspective of up to 5000 miles out in space using the zoom feature. You can color-code different areas to reflect different demographics. Towns, streets, highways, even railroad tracks can be displayed graphically.

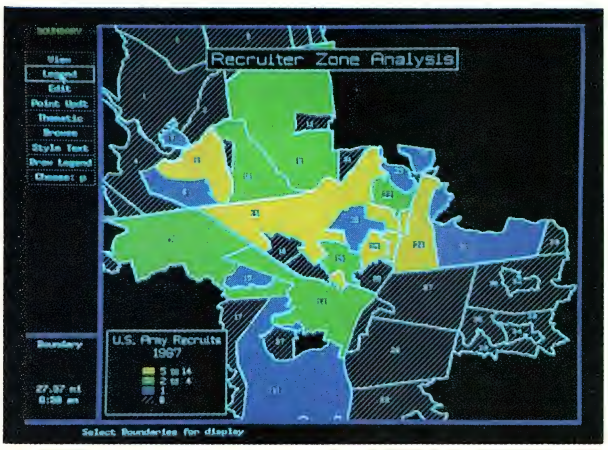
Mapping Information Systems sells several add-on data bases with a variety of additional demographic and mapping data that let you address your special needs. For example, the $195 *MapPack Sampler* provides a digitized map of the United States with point locations of 5000 U.S. cities, boundaries of all the states, ZIP codes, and telephone area codes, plus an overlay map of the interstate highway system.

You can use *MapInfo*'s data base of street maps covering more than 330 metropolitan areas and thousands of suburbs to locate a street address and then open a window that displays the record for that address. The maps interact directly with the data base so that editing in one updates the data in another. Maps are redrawn instantly when the data changes or the information is examined from another perspective.

The program supports a wide variety of printers and plotters, and files can be exported to other programs such as *Ventura Publisher* and *Harvard Presentation Graphics* for adding maps to documents that accept the CGM (Computer Graphics Metafile) format.

MapInfo requires 640K of memory, a hard disk, and DOS 2.00 or a later version. It supports CGA, EGA, VGA, Hercules, and some higher resolution boards such as the IBM 8514A graphics adapter. The core program is priced at $750; digitized maps/data bases are sold separately for $95 to $2000. Mapping Information Systems, 200 Broadway, Troy, NY 12180; 800/327-8627, 518/274-8673.

Reader service number 744



Make all of those names, addresses, and notes in your data base truly meaningful by turning them into maps with MapInfo. Create pin maps of your sales locations or road maps for travel between locations.

TASK-force

Big Deal for Small Biz

The 1980s are likely to go down in history as the decade of the entrepreneur, as small businesses spice up the economy with hordes of innovative products and jobs. But small businesses—particularly those based at home—often lack the financial expertise found in larger firms, and that costs them plenty.

The 20,000-member American Home Business Association (AHBA) figures that the average person working out of the home spends the equivalent of one day a week just keeping the books. The association and Blue Chip, a maker of low-end PCs, have introduced *TASK-force*, an accounting package they figure can cut that time down to 2 hours a week, saving the average home-based business more than $8700 a year.

The $159 business management program targets the 13 million or so Americans whose morning commute consists of a stroll to the den or the kitchen table. Developed as a result of AHBA market research, *TASK-force* is a menu-driven, all-in-one small-business package that includes accounting as well as desktop accessory modules.

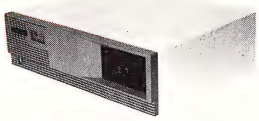
You can start out with a job estimate, then turn it into an invoice with one or two keystrokes. With a few more simple commands, *TASK-force* ages that invoice, keeps track of who owes you money, writes statements, reports payables, balances your checkbook, creates a balance sheet, and generates a profit and loss statement at any point in the program. No inventory checking is provided since the program is designed primarily for service-oriented businesses that don't stock products.

Other features include a spreadsheet, a word processor, a spelling checker, a list manager, graphics (pie charts and bar graphs), communications, and desktop utilities such as a calendar, memo pad, calculator, clock, and DOS disk manager.

The AHBA says its research consistently shows that home-based businesspeople don't adapt successfully to existing business management software. These entrepreneurs find a large gap between personal financial management software—which isn't designed for business support—and the more complex management and accounting programs developed for larger businesses. *TASK-force* intends to fill that gap, and Blue Chip hopes you'll run the program on one of its low-cost PCs.

The RAM-resident package requires 512K and DOS 3.10 or a later

Network Wish List:



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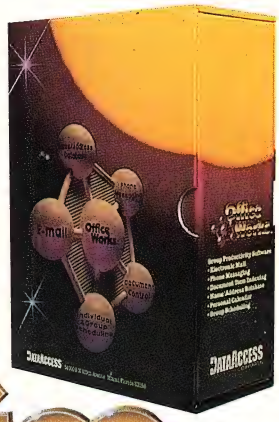

There are many ways to improve network performance, but only one way to improve the performance of the people who use your network: Office Works.

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version. Blue Chip Int'l, 7305 W. Boston St., Chandler, AZ 85226; 602/961-1485.
Reader service number 745

Paragon 286V

Get It All, Keep It Small

Some computer vendors give you lots of empty slots in a big box. Others put everything but the kitchen sink on the motherboard and squeeze it into a small case with only a couple of available I/O slots. Still others focus on high performance with advanced features like a fast processor or high-resolution display adapter. American Mitac lets you have it all with the Paragon 286V—high integration, advanced features, lots of slots, a competitive price, and a small footprint.

You get a 12-MHz 80286 processor switchable to 8 MHz, up to 8MB of memory, VGA graphics, six empty slots on an AT bus, and room for three storage devices—all in a 14-by-16-by-6½-inch form. Mitac packs so much in such a little package by moving many control functions and all the main memory onto the motherboard. The VGA resides there, as does the controller for two types of floppy drives. The Paragon 286V has 1MB of memory, with room for another 7MB on the motherboard via 1MB memory modules. You can run your VGA monitor and load up on memory without touching a slot.

The expansion bus has five 8/16-bit slots and one 8-bit slot. The Paragon 286V supports the Lotus/Intel/Microsoft Expanded Memory Specification 4.0 and gives you both a standard 9-pin digital connection and a 15-pin PS/2-type analog connection for your monitor.

The base configuration includes one 3½-inch 1.44MB floppy drive and a 5¼-inch 1.2MB unit, two serial ports, one parallel port, a clock/calendar, and a 101-key keyboard. You also get DOS 3.30; GW BASIC; and five memory, disk, and display management utilities—all for $2195.

You can choose a 14-inch color VGA monitor for $549 or a 12-inch monochrome VGA monitor for $210; a 40MB, 28ms hard disk and controller go for $734. American Mitac Corp., 410 E. Plumeria Dr., San Jose, CA 95134; 800/648-2287, 408/432-1160.
Reader service number 746

Mitac's Paragon 286V boasts high system-board integration, advanced features, lots of slots, a competitive price, and a small footprint.

BRIEFLY NOTED

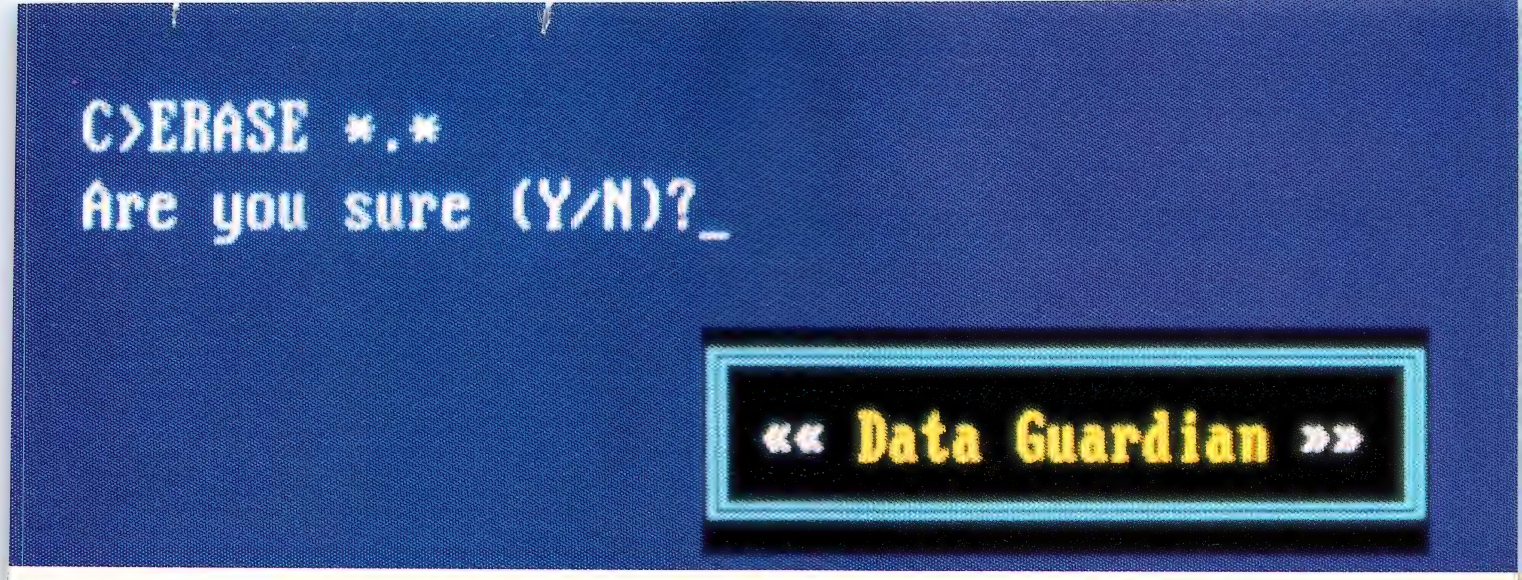
3000 NL, 1000 TL, 1000 SL

Tandy Corporation/Radio Shack has upgraded several models in its PC line, adding more complete integration, faster processing, and more memory options. Tandy has replaced the 3000 HL, popular among its mainstream business customers, with the 3000 NL, which includes a 10-MHz 80286 processor instead of an 8-MHz one. Its seven expansion slots include four 8/16-bit and three 8-bit slots, as well as a dedicated memory slot that runs at processor speed regardless of how fast the bus is running. The company claims it delivers as much as a 30 percent performance gain.

The 3000 NL ships with 512K of memory, expandable to 640K on the motherboard, and up to 16MB using two add-on cards. It's also equipped with one 3½-inch, 1.44MB floppy drive—instead of the 3000 HL's 5¼-inch drive—with room for another 3½-inch device and two 5¼-inch drives. Also standard are a parallel port, a serial port, and a 101-key keyboard. The base configuration, which includes an 80287 coprocessor slot, retails for $1699. The monitor, its adapter, and hard drives are extra. Tandy offers a $250 EGA adaptor that drives a monochrome or color digital monitor, and a $400 VGA adapter for use with your choice of a monochrome analog or either of two color analog monitors.

Tandy also has upgraded its low-end PCs. The 1000 SL replaces the 1000 SX, and the 1000 TL replaces the 1000 TX. The 1000 SL has an 8086 microprocessor instead of an 8088, while the 1000 TL has an 80286; both are switchable between 8 MHz and 4.77 MHz. The SL ships with a 5¼-inch drive, the TL with a 3½-inch; both have room for two additional drives of either size.

All five 8-bit slots are free, since the motherboard includes a video adapter for monochrome text display, as well as



New Disk Optimizer® gives you the courage to say yes!

Introducing Disk Optimizer 4.0. Now with Data Guardian™ and Undelete.

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That's fine for erased files, you say. But what happens if you accidentally format your hard disk? No problem. Disk Optimizer comes through again with *UnFormat* that can instantly restore all the data on your disk to exactly where it was before that little slip of the finger on the keyboard.

And to make sure your data is really safe, the *TrackSaver* feature protects the surface of your disk from excessive wear by preventing the head on your drive from spinning over the same track for too long. And the *Refresh* program prevents the bad spots that develop on disks due to fading magnetic charges.

Still the safest buy in performance optimizers.

As always, Disk Optimizer also gives you the safest, most advanced performance optimization available – proven by over a quarter of a million users.

The *Optimize* program speeds up disk reading and writing times by up to 300 percent by un-doing the file fragmentation that takes place naturally over time. The *DOConfig* program lets you arrange the layout of your disk for best overall performance. And the *Analyze* program gives you a graphical look at the condition of your disk, so you'll always know when it's time to optimize again.

A total of 17 different programs.

Disk Optimizer includes *Findfile* for locating files by name or wildcard anywhere on your disk. *Sorts* for rearranging files and directories in the way that makes sense to you. *Lock* and *Unlock* for password-protected file security. *Killfile* for erasing sensitive data permanently. And lots more.

In all, there are 17 different programs in the new Disk Optimizer. Each one designed to improve performance, guard your data, and make disk management easier and simpler for everyone.

So get new Disk Optimizer 4.0, and get more than the courage to say yes. Get the peace of mind and total confidence that your disk is running better and safer all the time.

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Call 800-272-9900
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SOFTLOGIC SOLUTIONS

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The 3000 NL, 1000 TL, and 1000 SL bring increased integration, faster processing, and more memory options to Tandy's PC line and replace the 1000 SX and the 1000 TX.

Hercules or CGA graphics with 16 colors at 640 by 200 resolution. Another added feature is three-voice sound with a digital-to-analog-to-digital sound converter enabling you to record, store, and play back true speech and music from any analog source.

Both models feature Tandy's autoboot capability with DOS version 3.30 in 512K of ROM. Tandy's Deskmate environment, which contains the Deskmate desktop utilities, a mouse driver, and an 80,000-word spelling dictionary, is also contained in ROM and comes up when the system boots. The 1000 SL is aimed at the home and education markets; the 1000 TL is intended for small to medium-size businesses.

Without monitors, the 1000 SL retails for $899 and the 1000 TL for $1299. Tandy Corporation/Radio Shack, 1800 One Tandy Center, Ft. Worth, TX 76102; 817/390-3011.
Reader service number 748

Who/What/When Office

Chronos Software offers a way to coordinate the people and resources of a networked work group using its *Who/What/When Office* scheduling package. At the heart of *Who/What/When Office* is a daily calendar for each member of your work group. Individuals can enter details of meetings: whom he or she is seeing, what the meeting is about, and when and where it is to take place. There is room for scheduling group meetings, prioritizing to-do lists, delegating tasks, and describing projects. The information is then cross-referenced into three views.

The People view displays the projects and schedules of the people with whom you work. The Project view displays current projects, the people involved, milestones, and deadlines. The Time view displays the daily calendars of all your fellow network members, whom they are seeing, and the subject matter. The program automatically prompts for available time slots for work group members and shared resources such as conference rooms, and it checks for conflicts.

Who/What/When Office coordinates projects, updating team members on any changes. Using *Who/What/When Office*'s memo function, a meeting agenda can be sent throughout the network. The program supports external modem communications and recognizes group as well as individual mailboxes.

Who/What/When Office produces automated management reports on a per-person or companywide basis. Time reports include daily schedules, company calendars, and monthly overviews. Project reports, including Gantt charts and project calendars, show what responsibilities have been delegated, what tasks have been completed, and what remains to be done. People reports show all delegated tasks and work that are shared with another person or project.

Who/What/When Office runs on any server compatible with DOS 3.10 or as a value-added process under Novell's *Netware 2.1* or a later version. *Who/What/When Office* retails at $695 for a 30-user, single-server license and $75 for each user manual. Chronos Software, 1500 16th St. #100, San Francisco, CA 94103; 415/626-4244.
Reader service number 749

Extend-A-Name

World Software breaks the DOS 8-character barrier with a memory-resident product that lets you use up to 60 characters to name a file. *Extend-A-Name* is compatible with all popular text-mode PC packages that prompt you to type in a file name. At that prompt, *Extend-A-Name* pops up with its own directory of extended names; you then select your file using a highlight bar and <Enter>. Up to 12 file or subdirectory names can fit on the screen at one time.

You can name a new file with a more complete description, such as "Balance Sheet—Fiscal Year 1988." You also have the option of either creating a second, 8-character name that DOS will recognize, or letting *Extend-A-Name* create one for you consisting of your initials and a number sequence. While *Extend-A-Name* is on screen, you also have access to common DOS commands for file management.

Extend-A-Name requires 39K of memory for up to 100 file names per subdirectory, and up to 65K for 400 file names. Compatible with EMS

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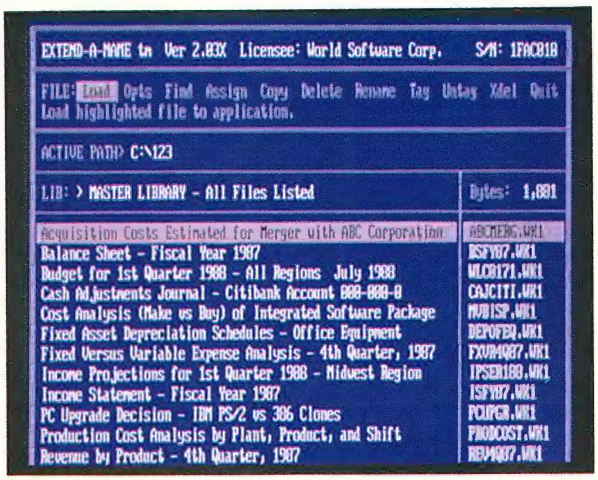


Do away with the 8-character file name limit—memory-resident Extend-A-Name lets you create file names of up to 60 characters.

3.2, it needs only a 3K kernel in conventional memory. The default hotkey configuration, <Alt>-X, can be changed to any <Alt>-*key* combination.

Extend-A-Name requires DOS 2.00 or a later version and retails for $79.95. World Software Corp., 124 Prospect St., Ridgewood, NJ; 201/444-3228.

Reader service number 750

Battery Watch

Portable computing specialist Traveling Software has a new utility that lets you know exactly how many hours of use are left in your laptop's batteries before they need to be recharged. *Battery Watch* monitors all of the battery-draining functions in your laptop every 2 seconds and gives you the remaining battery time in hours and minutes. A fuel-gauge-like graphic automatically pops up in a window when you're running out of juice.

The package, which works with both nicad and lead-acid batteries, requires from 15K to 18K of memory. *Battery Watch* also boasts a "deep-discharge" feature, which counteracts the tendency of nicad batteries to lose operating time between recharges due to the "charge memory effect." The deep-discharge utility completely drains the battery before recharge. *Battery Watch*, which retails for $39.95, is compatible with laptop models from Zenith, Toshiba, Epson, Quadram, IBM, NEC, and Tandy. Traveling Software, Inc., 19310 N. Creek Pkwy., Bothell, WA 98011; 206/483-8088.

Reader service number 751

Microsoft Word Companion Disk

Help! Those four letters say it all. When your plea goes out, the last thing you want to do is plow through your user manual for obscure references to cryptic error messages. Nor do you want to languish on hold over a long-distance technical support line—assuming your warranty hasn't run out—especially if your business also is on hold until you get the computer up and running again.

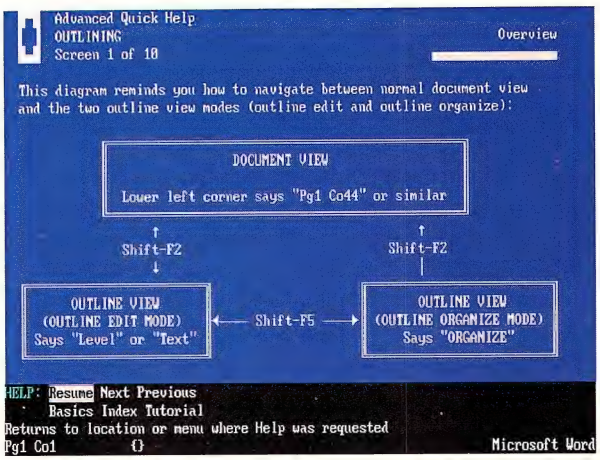
What you want is intelligent help at your fingertips, which is precisely what the Advanced Quick Help feature provides for *Microsoft Word 4.0*. Taking advantage of *Word*'s context-sensitive Help command, Advanced Quick Help replaces the program's current help messages with insights from Peter Rinearson, a Pulitzer prize–winning author of three books on *Microsoft Word*. Instructions are ad hoc and far more extensive than those that ship with *Word*.

But Advanced Quick Help is only one of 23 files on Rinearson's *Microsoft Word Companion Disk*. Other files contain more than 300 macros and a variety of style sheets, sample print-merge letters, and other utilities.

The macros are organized into several libraries. One contains 80 general-purpose macros that copy text to a file, update summary sheets, print envelopes, zoom windows, and so on. Another library contains 14 macro modules that can be attached to specific *Word* modes. Other libraries contain glossaries that help you write your own macros or that teach *Word* to recognize *WordStar* commands.

The *Microsoft Word Companion Disk*, which retails for $19.95, is available from Rinearson Support Associates in 5¼-inch or 3½-inch format. 219 First Ave. N #410, Seattle, WA 98109; 800/345-9111.

Reader service number 752



One of 23 files on the Microsoft Word Companion Disk, Advanced Quick Help replaces the program's current help file with extended assistance. Also available are more than 300 macros and a variety of style sheets, sample print-merge letters, and utilities.

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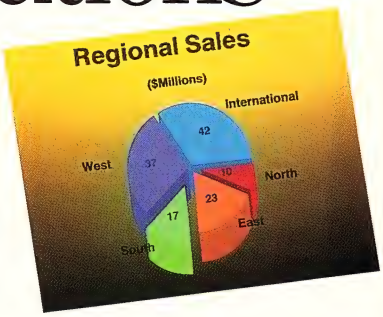

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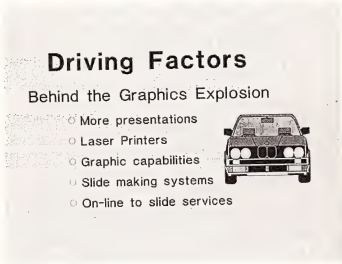

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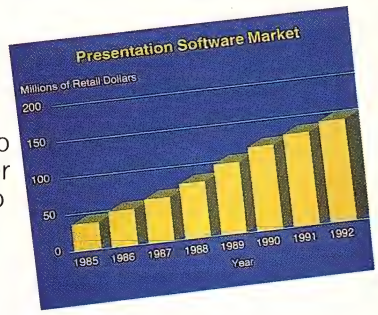

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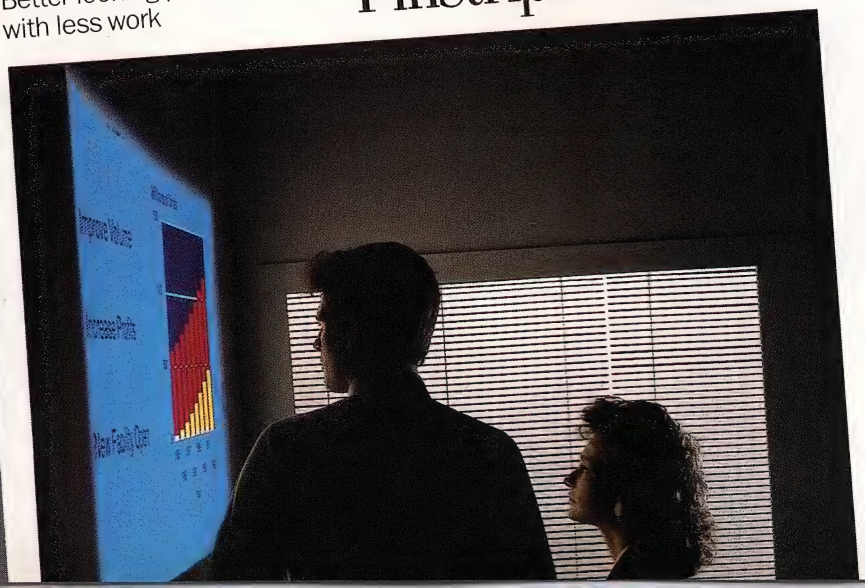

"Stunning is the best way to describe the speed and efficiency in which (Pinstripe Presenter) performs its tasks."

Infoworld

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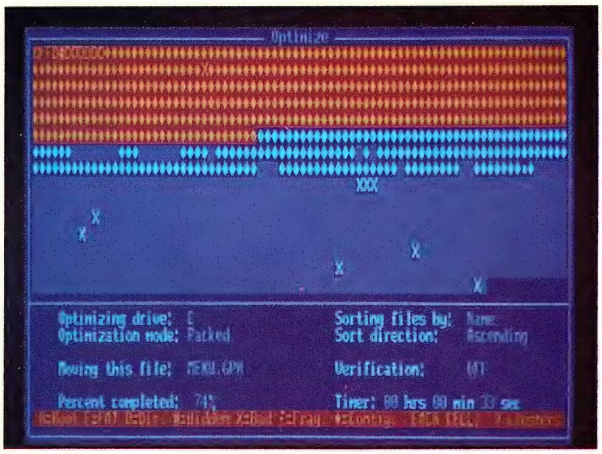
OPTune

Gazelle Systems has introduced an all-in-one hard disk survival, repair, and tune-up utility to ensure that your hard drive operates at maximum efficiency. Like other disk optimizers, the $99 *OPTune* gathers scattered file fragments into sequential clusters, but only this program offers additional seek-speed enhancements.

For example, *OPTune* sorts file and directory entries and puts them in one place at the front of the disk; this speeds up directory searches, enables programs to load faster, and reduces head wear. The program eliminates erased file entries, giving you slimmer directories and potentially more disk space.

The program also lets you set your hard disk's interleave (which *OPTune* determines) for optimum synchronization with other elements of your controller, thereby improving speed as much as 300 percent. *OPTune* uses 256-bit-wide test patterns to identify bad disk sectors and moves data from bad clusters to reliable areas of the disk. For extra insurance, every time it's run, the program backs up your file allocation table and root directory and saves them in a hidden file in case the originals are damaged.

OPTune, which features pulldown menus and automatic help screens that appear as each feature is selected, requires DOS 2.00 or a later version and 256K of memory. Gazelle Systems, Inc., 42 N. University Ave. #10, Provo, UT 84601; 800/233-0383, 801/377-1288.
Reader service number 753



OPTune optimizes your hard disk by clustering files, speeding directory searches, and moving data from bad sectors to reliable ones.

EFAX-88

The overnight letter was a first step toward instantaneous information exchange, and it quickly became a hit. But today, personal facsimile machines can often do the job faster.

The Avatex EFAX-88 is a reasonably priced, 20-second-per-page personal copier/fax with an adjustable scanning mode for transmitting both graphics and photographs.

For those seeking the basics, the Avatex EFAX-88 personal copier/fax unit may fill the bill. Its $1149 price is about average for its range of capabilities, which includes a reasonably fast 20-second-per-page transmission speed, an adjustable scanning mode for transmitting graphics and photographs, and a manual switch that allows you to transmit documents in the midst of a phone conversation.

The EFAX-88's fallback feature guarantees error-free transmissions by automatically adjusting its rate from 9600 bps to 7200, 4800, 2400, and below if line problems crop up. Weighing less than 10 pounds, the EFAX-88 can perform as a personal copier. A 110/220 voltage selector and an optional acoustic coupler also make the EFAX-88 a practical unit on the road. Elec & Eltak (U.S.A.) Corp., 1230 Oakmead Pkwy. #310, Sunnyvale, CA 94086; 408/732-1181.
Reader service number 754

386 MotherBoard/AT

Hauppauge is offering a motherboard upgrade that will turn an IBM AT or compatible into an 80386-based computer. Like Hauppauge's upgrade for PC and XT compatibles, the 386 MotherBoard/AT is a complete motherboard replacement, with 1MB of memory and the Award 386 BIOS. It's equipped with four 8/16-bit slots and four 8-bit slots and has a dedicated 32-bit memory connector that will accept up to 12MB of additional memory. There's also a slot for an 80387 coprocessor. The 386 MotherBoard/AT retails for $1595. Hauppauge Computer Works, Inc., 175 Commerce Dr., Hauppauge, NY 11788; 516/434-1600.
Reader service number 755

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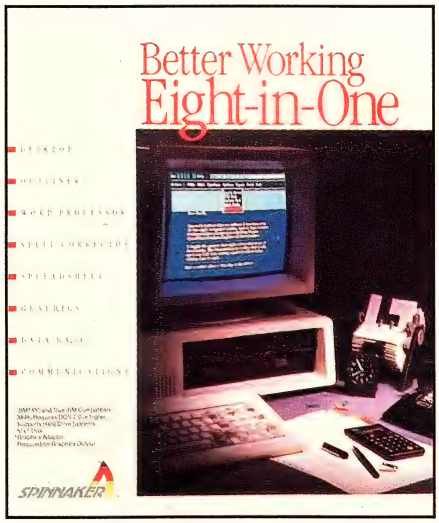
— ***PC Week***



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— ***Washington Post***

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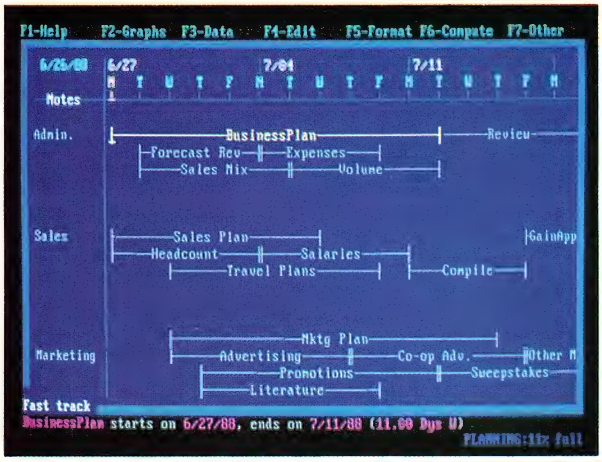
UPDATE

Harvard Project Manager 3.0

Software Publishing Corporation (SPC) has added a fast-tracking capability and outlining to enable novice project planners to make quick use of version 3.0 of *Harvard Project Manager*. The fast-track mode lets new users begin planning a project within 15 minutes. You enter task names and durations along a time scale, and *Harvard Project Manager 3.0* builds PERT and Gantt charts as well as a work-breakdown outline and a task list. The outline separates a project into its component tasks, each of which can be explored in greater detail by going to a deeper level of the outline.

SPC has also added calendars that note vacations and equipment commitments to be considered when scheduling resources; version 3.0 offers additional reporting capabilities, including the ability to run reports from a batch file and to create report templates, scaled reports, and E-size plots.

Harvard Project Manager 3.0 offers enhanced PERT views, including a PERT logic view and the ability to zoom a portion of the chart and track penalty costs. It can take advantage of extended memory and 43-line displays and has additional import/export capabilities. *Harvard Project Manager 3.0*, which requires 512K, DOS 2.00 or a later version, and a hard disk, sells for $695. Upgrades are available for $135. Software Publishing Corp., 1901 Landings Dr., Mountain View, CA 94039-7210; 415/962-8910.
Reader service number 756



Harvard Project Manager's fast-track module helps novice users begin planning a project within 15 minutes, quickly building PERT and Gantt charts and breaking projects down into specific tasks.

DeskJet Landscape Upgrade Cartridge

Hewlett-Packard has added a landscape option to its DeskJet ink jet printer. Especially useful for printing spreadsheets or tabular reports sideways, the landscape option uses Courier 16.67 pitch. You plug the cartridge into one of the printer's two expansion slots and select Courier 16.67; an LED indicates which font has been selected. The cartridge also supports boldface, super/subscripts, underlining, and double- and half-width letters.

Additional fonts are available in a second font cartridge, called the Landscape Fonts Cartridge, which includes Courier 10, Letter Gothic 12 (portrait) and 16.67 (landscape), and Letter Gothic Italic 12. Each cartridge costs $95.

The $995 DeskJet already supports Courier, Courier Bold, and Courier Compressed fonts. It prints full-page graphics at 300 dpi and text at either 120 cps in letter quality or 240 cps in draft mode. Hewlett-Packard Co., 3000 Hanover St., Palo Alto, CA 94304.
Reader service number 757

Foxbase + 2.10

FoxBase + 2.10, the *dBASE*-compatible data base manager, now has a series of customizable templates that aid in data entry and screen editing. The FoxView template lets you paint screens with color and draw lines and boxes on them. FoxGen produces data base applications that can run as is, without programming, or that you can modify to your liking. Both modules generate code that FoxCode compiles into compact, executable applications.

You can call any of the three template modules from the *Foxbase +* dot prompt or DOS. A new virtual-memory-management system writes *Foxbase +* to disk, creates a view of the operating environment, and automatically returns you to prior programming status when the template concludes operation. *Foxbase +* 2.10 also comes equipped with a variety of default templates, found in pop-up and pulldown menus, that let you perform other common application- or report-building operations without programming.

Also included is FoxDoc, a technical documentation system that lets you analyze an application and develop detailed summaries of variable cross-reference, tree-structure, data-dictionary, index, format, label, and report files, as well as other types of reports. *Foxbase +* 2.10, which requires DOS 2.00 or a later version, 360K of memory, and a hard disk, retails

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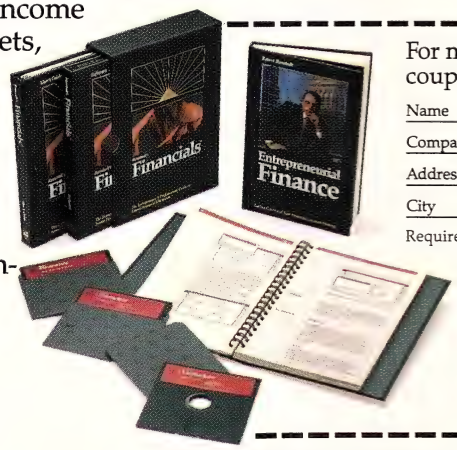

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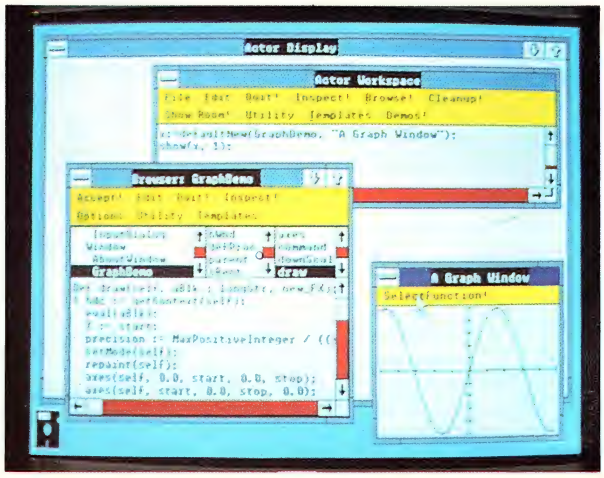


EMS 4.0 expanded memory support and enhanced memory management are the new features in Actor 1.2, the object-oriented programming language for the Microsoft Windows environment.

for the same $395 as prior versions; upgrades are $75. Fox Software, Inc., 118 W. South Boundary, Perrysburg, OH 43551; 419/874-0162.
Reader service number 758

Actor 1.2

The Whitewater Group has added expanded memory support to version 1.2 of *Actor*, its object-oriented programming language for the *Microsoft Windows* environment.

Actor 1.2 lets you use up to 500K of expanded memory under EMS 4.0 for each programming session, and it fully supports the calls, messages, and menu styles of *Windows/286*. *Actor 1.2* handles the memory management chores and produces stand-alone *Windows* applications that follow all of the environment's conventions for dynamic data exchange and linkage with Microsoft C code. Whitewater provides add-ons for its interactive language, including the $99 *Language Extensions I* disk with macro capability, conditional compilation, object storage, ordered dictionaries, and other facilities.

Actor 1.2, which retails for $495, is shipped with a run-time version of *Windows/286*. Registered users can upgrade for $80 or get the upgrade free if they purchase unlimited support for $250. The Whitewater Group, Technology Innovation Center, 906 University Place, Evanston, IL 60201; 312/491-2370.
Reader service number 759

Turnkey 3.1, Turnkey 3.1 Menu Builder's Version

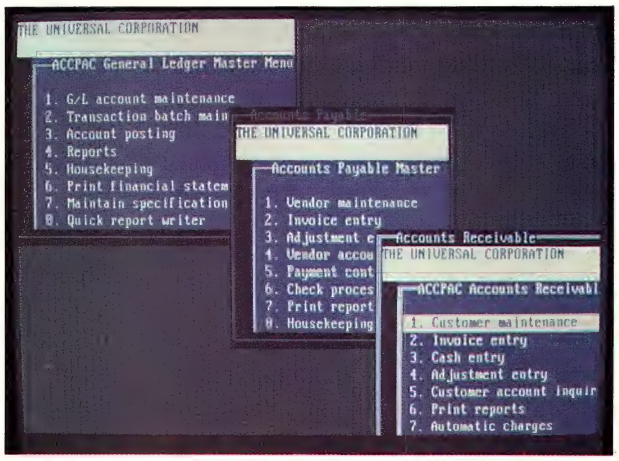
Optimal Solutions has introduced both an update and a developer's version of its *Turnkey* menu-building utility. Equipped with the *1-2-3*-like interface that is *Turnkey 3.1*'s major enhancement, *Turnkey 3.1 Menu Builder's Version* also lets you create executable run-time versions of menus that your fellow workgroup members can use but not change. Written in the *dBASE*-compatible *Clipper* compiler, *Menu Builder* lets you produce faster-running menus that use less memory.

Since neither version is memory resident, your applications can use all the system memory. You can create as many as 1000 nested menus containing up to 15 choices each, and add password protection to each menu item if you wish. *Menu Builder* features on-line help with context-sensitive messages. Because it's so easy to use, *Turnkey* and *Menu Builder* ship without manuals; all documentation is on line.

Turnkey 3.1 retails for $49. Upgrades from *Turnkey 3.0* are available for $10; menus written with earlier versions are not usable under version 3.1. *Turnkey 3.1 Menu Builder's Version* sells for $295 with a run-time license for 100 users. Both 3.1 packages require DOS 2.00 or a later version, 256K of memory, and a hard disk. Optimal Solutions, 6 Salem Rd., Atkinson, NH 03811; 603/362-4758.
Reader service number 760

Accpac Plus Windowing System Manager, LanPak

Computer Associates has beefed up its *Accpac Plus* accounting system with *Windowing System Manager* and *LanPak*, which are more powerful and versatile than the company's previous windowing and LAN modules. *Windowing System Manager* provides an advanced



The Accpac Plus accounting system has gained a new Windowing System Manager with an advanced macro facility, enhanced information searching, and multitasking as well as an enhanced LAN interface.

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LAP-LINK transfers files between IBM and compatibles, laptops and desktops, including the new IBM PS/2. It installs in seconds, features a split-screen design for showing files in both computers, and transfers data at incredible speeds of over 115,200 baud.

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macro facility, enhanced information searching, and the ability to switch between different *Accpac* applications in a windowed environment. The macro facility, which includes a macro recorder, lets you automate routine tasks like month-end accounting and supports error-checking parameters (such as imposing credit limits) that reduce the possibility of data entry mistakes.

Windowing System Manager doesn't permit data exchange between windows, but an advanced data-search function, SmartFinder, uses artificial intelligence techniques to reduce the need for precise queries. Type some letters in the SmartFinder window and it searches through all *Accpac* master files—including customer orders, inventory, and general ledger—to find partial matches and similar-sounding words.

LanPak provides an interface between network software and *Accpac Plus* applications. It's compatible with Novell *Advanced Netware*, *3Com 3+*, IBM's *PC LAN Program*, and all DOS 3.10–compatible networks. Different work-group members can share the same data while tasks such as accounts receivable, order entry, and accounts payable are divided among them.

Windowing System Manager, which retails for $195, replaces the current *EasyPlus Windowing System; LanPak*, which offers a four-user license for $395, replaces the *Network Manager*. Upgrades are free to anyone who purchased the earlier products after October 15, 1987. For anyone who purchased the program before that date, there is a $50 charge for the *Windowing System Manager* and a $100 charge for the *LanPak*. Computer Associates Int'l, 1240 McKay Dr., San Jose, CA 95311; 408/432-1727.
Reader service number 761

Media Master 5.0

Intersecting Concepts has released an upgrade of its disk-to-disk formatting utility for IBM PS/2 computers. *Media Master 5.0* enables PCs, PS/2s, and compatibles to read, write, and format more than 200 types of CP/M, DOS, and TurboDOS disks so that you can share information between incompatible computer systems. You also can customize the software using setup files. Other improvements include on-line context-sensitive help, full-color support, first-letter menu selection, and an easier installation procedure. The program retails for $49.95, but registered users can upgrade for $23.50. Intersecting Concepts, 80 Long Court #1A, Thousand Oaks, CA; 800/422-8018.
Reader service number 762

A Windows-compatible draw package, Designer 1.2 offers enhanced desktop publishing tools—it can output Encapsulated PostScript files and work with color printers such as the QMS ColorScript 100.

Designer 1.2

Micrografx has enhanced the desktop publishing capabilities of its *Windows*-compatible graphics product, *Designer*. Version 1.2 includes an optional Pantone PMS color palette, the ability to output Encapsulated PostScript (EPS) files, and support for color printers such as the QMS ColorScript 100. *Designer 1.2* offers full-color graphic art, technical illustration and drafting capabilities, and an enhanced color interface; you can access over 16 million colors and load and save custom palettes. *Designer* is equipped with CYMK, RGB, and HLS color models. The PMS palette is available for $99.95. In addition, version 1.2 adds on-screen WYSIWYG text editing so that you don't need to enter text in a separate window. *Designer 1.2* requires an 80286-based computer or better with 640K of memory, a hard disk, an EGA graphics card and monitor, and a mouse. It retails for $695. Upgrades are $99 or free to anyone who purchased the program after May 1, 1988. Micrografx, Inc., 1820 N. Greenville Ave., Richardson, TX 75081; 214/234-1769.
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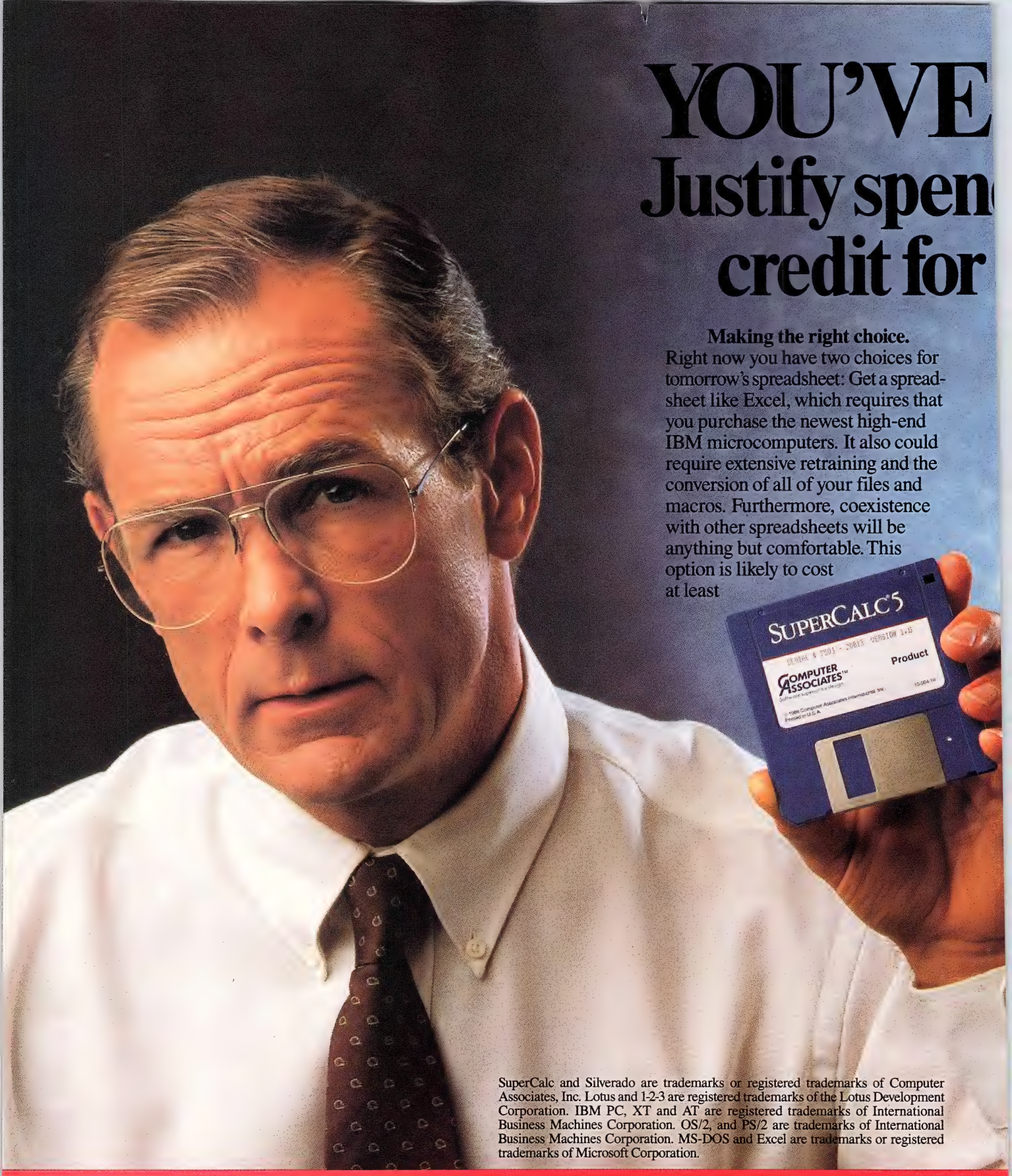
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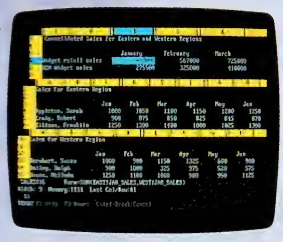

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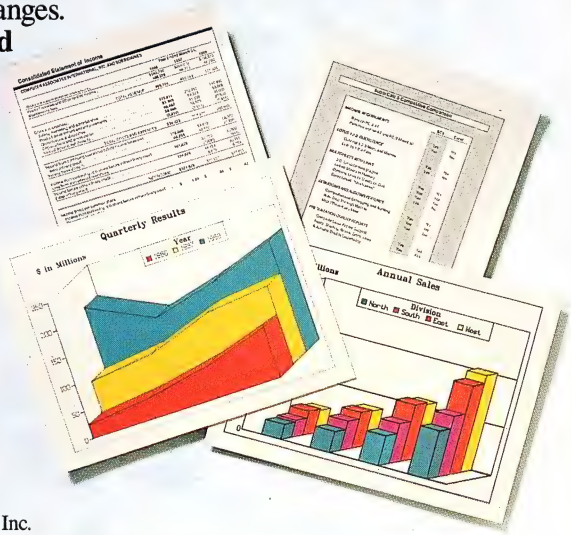

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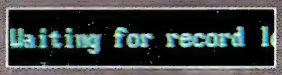

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LAN E-Mail: Power to the Work Group

LAN E-mail programs have finally come of age.

PC World looks at four powerful (though sometimes pricey) programs for networks of every size.

Gordon Haberfelde

For many businesses, the convenience of electronic mail is a prime incentive for buying a LAN. The ability to shuttle messages and files throughout a work group eliminates telephone tag, streamlines group projects, and boosts interoffice communication. Yet most E-mail programs bundled with network operating systems are difficult to use, provide only primitive messaging features, and are limited to transporting text.

Luckily, a number of third-party vendors are breathing new life into this genre. *PC World*'s roundup explores four new, intuitive, sophisticated, LAN-based E-mail programs that are compatible with any NETBIOS or DOS LAN: *cc:Mail* from cc:Mail, Inc.; *The Network Courier* from Consumers Software; *InBox/PC* from Symantec Corporation; and *Da Vinci eMail* from Da Vinci Systems. Each offers extensive messaging features, basic file management, a built-in text editor, and the ability to swap everything from formatted *Microsoft Word* documents to *1-2-3* worksheets to *AutoCAD* graphics over a LAN with ease.

Easy E-Mail

Features are a big factor in the E-mail purchase decision—but not the only one. Because an E-mail system is used by PC pro and neophyte alike, ease of use is just as important. The basic process—addressing, composing, attaching files to, and sending a message—must seem as natural as sending an interoffice memo, or the E-mail system simply won't be used.

Accordingly, all of the reviewed E-mail programs adopt a similar (and simple) metaphor. You post mail to an out-box, and you're notified by a beep or pop-up window when mail arrives in a separate in-box. You can read the mail (typically one message at a time), respond to it, delete or print it, and save messages to disk.

Just as important, all the programs sport menu-driven interfaces. *cc:Mail* and *InBox/PC* use pop-up menus that can be run with single keystrokes; *The Network Courier* relies on a *1-2-3*-like command line; and *Da*

MAX SEABAUGH

Vinci eMail works faithfully in the *Microsoft Windows* mold, complete with pulldown menus and dialog boxes. Most of the programs supply a fairly large set of keyboard shortcuts for bypassing menus.

Don't worry about installing any of the reviewed packages—that's a job for the network administrator. The E-mail program typically resides on the LAN's server—all you do at your PC is store messages. Network administrators, however, will appreciate how relatively easy these programs are to install.

Feature Rich

Of course, you get more than a cozily familiar electronic mail room for your money. You can run any of these programs except *cc:Mail* like a memory-resident utility: Press a definable hot key, jump into the E-mail program, send and receive messages, and then jump back into the underlying application. You can even cut data out of a file and paste it into an outgoing letter composed with the E-mail package's built-in (though usually crude) text editor. But there are limits.

For example, only *cc:Mail* can pull both ASCII data and graphics into a message; the rest of the programs are limited to ASCII data. Then there's *The Network Courier*, which works as a RAM-resident program but can't cut and paste data from the active, underlying application, only from a static file. *InBox/PC*, on the other hand, takes data only from an active application.

The issue may be moot anyway. Most users will probably jot a short note with the package's text editor, attach a word processed document plus any supporting graphics files, and send the result along. Attaching files is simple with all of these packages. Once you've created a message, you just supply the path and name of *any* file—worksheet, *PageMaker* document, *1-2-3* .PIC file,

FEATURES EVALUATION

LAN E-Mail Packages

Third-party mail packages aren't necessarily cheap, but they provide far more functions than E-mail programs bundled with network operating systems.

	cc:Mail 1.2	The Network Courier 1.0	InBox/PC 1.24	Da Vinci eMail 1.2
Messaging				
Memory resident	○	●	●	●
Attaches graphics and formatted files to message	●	●	●	●
Number of attachments	20	10	1	△
Graphics within message	●	○	○	◒[1]
Forwards mail	●	●	●	●
Return receipt	●	●	●	●
Carbon copies	●	●	○	●
Blind carbon copies	○	○	○	○
Bulletin board	●	○	●	○
Private mail lists	●	○	●	●
Public mail lists	●	●	●	●
Ready-made electronic forms	○	○	●	○
Priority classifications	○	●	◒[2]	●
Automatic file encryption	●	●	●	●
Password by mailbox	●	●	●	●
Password by message	○	○	○	●
Text editing				
Text editor	●	●	●	●
Built-in graphics utility	●	○	○	○
Changes text attributes	●	○	○	○
Screen snapshot utility	●	○	○	◒[1]
Cuts and pastes				
ASCII	●	●	●	●
graphics	●	○	○	◒[3]
from current application	◒[4]	○	●	●
from static files into application	●	●	○	●

	cc:Mail 1.2	The Network Courier 1.0	InBox/PC 1.24	Da Vinci eMail 1.2
Message management				
Stores mail in folders	●	○	○	○
Global processing of files	○	●	●	●
Saves copies of outgoing mail	●	●	●	●
Sorts mail by				
sender	●	●	○	●
date	●	●	○	●
date range	●	○	○	●
priority	○	●	○	●
subject	●	●	○	●
keyword	○	○	○	○
attachment	●	○	○	●
Connectivity				
Links with external networks	●	●	○	○
Links with on-line mail systems	●	●	○	○
Links with PROFS mainframe	●	●	○	○
Links with remote PCs	●	●	○	○

● Yes ○ No ◒ Deficient △ Limited only by available RAM

[1] Via Windows' print-screen function.
[2] Only via "urgent" phone message form.
[3] Print-screen images only; stored in Windows' Clipboard, which must be attached to message.
[4] Similar result possible with program's built-in screen snapshot utility.

Harvard Graphics pie chart, whatever—and issue a few commands to strap it to your message. You can typically attach any combination of files to a message, but most of the reviewed packages limit the size of files or the number of attachments. Make sure the package you choose meets your messaging requirements.

Getting your messages across the LAN is also pretty easy. You can create mailing lists with all the packages, so a single missive is delivered to many users simultaneously. *The Network Courier* restricts you to public lists created by the network administrator, but the rest let you design private lists. All the programs provide a "return receipt requested" feature that notifies you when your letter has been read, let you reply directly to a message and save a copy, and automatically encrypt files. All but *InBox/PC* issue carbon copies.

Message management has also taken a step forward. All of the reviewed programs display the date and sender of each message, and some let you enter subject descriptions and priority ratings. All but *InBox/PC* let you search and sort mail on such fields. Better still, most let you tag a number of files and then delete, print, or save them en masse. The winner in this category? *cc:Mail*, which does most of the above and lets you organize messages into distinct "folders"—a clever feature also used by *Lotus Express*.

Finally, if your messages need to reach other LANs, mainframes, remote PCs, or even MCI Mail, you'll want to focus on *cc:Mail* and *The Network Courier*, which offer numerous connectivity options. Just be prepared to pay the price. For example, a *cc:Mail* module that shuttles E-mail to gatewayed LANs costs $1295 per network. *The Network Courier*'s PROFS mainframe gateway costs a whopping $5000. But don't count on making the PC-to-Macintosh connection just yet. PCs on an AppleShare network running *cc:Mail* can swap messages with Macs; PC and Mac versions of *InBox* will be able to communicate in the near future.

In making your buying decision, pay close attention to features and pricing options. Connectivity may not be an issue now, but it could be later. And an E-mail program might be priced right for a small network but not for a large one.

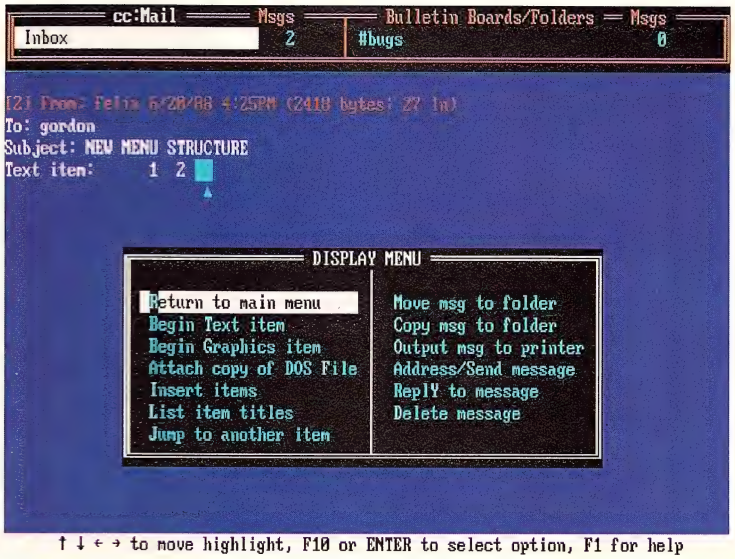
EXECUTIVE SUMMARY

cc:Mail

LAN E-mail package

The pick of the litter. *cc:Mail* includes a full set of messaging features, offers message folders, and is the only package that can incorporate both text and graphics in messages.

	POOR	FAIR	GOOD	EXCELLENT
Interface			●	
Messaging			●	
Message management				●
Text editing				●
Connectivity			●	
Overall value			●	



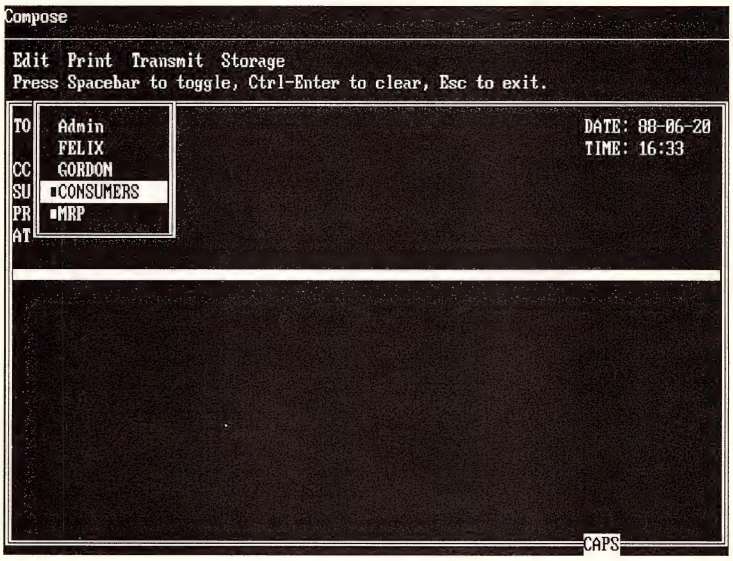
cc:Mail's easy-to-use pop-up window interface hides a powerful E-mail program.

cc:Mail

If money is no object, *cc:Mail* is the E-mail program of choice. The reviewed version couldn't run as a RAM-resident application, but the recently released version 3.0 does. More important, the program is clearly documented, includes in-context help, is easy to use, and offers innovative features and a large number of connectivity options. (An Import/Export module even lets you create a custom gateway to any system.) Due to *cc:Mail*'s high cost, however ($695 for 25 users and $1290 for unlimited nodes), those with populous LANs may find *The Network Courier* a better deal. In overall value, the two packages tie for first place.

cc:Mail's straightforward opening screen contains a centrally placed main menu and two status windows at the top that list received messages and the number of messages stored in folders. You select options from the menu to retrieve, read, send, or store messages; you pick valid addresses, options for attaching files, and so on from pop-up menus. It's an uncluttered, hand-holding system that new users will pick up easily.

cc:Mail's built-in text editor is clearly the best of any reviewed here, providing search and replace, margin control, and extensive block move/delete functions. Unlike its competitors, *cc:Mail* can also incorporate graph-



Strictly business, The Network Courier adopts a 1-2-3–style menu-bar interface.

ics in messages. Instead of using a cut-and-paste approach, however, you take a snapshot of a displayed image that converts it into a bit map. Once in the *cc:Mail* fold, you can edit the image, label it with color text, and add lines, boxes, circles, and shadings using *cc:Mail*'s built-in graphics utility. Similarly, text can be captured and manipulated with *cc:Mail*'s text editor.

cc:Mail also offers superior message management. You can sort messages by date, subject, title, or any combination thereof, and later store them in private, named folders or on a "bulletin board" where LAN-wide messages can be posted. You can have a maximum of 200 folders, each holding as many as 500 messages. On the downside, you can't assign priorities to messages, nor can you tag them for global deletion, copying, and so on.

Version 3.0 of *cc:Mail*, released at press time, not only adds a RAM-resident module for sending and receiving mail but expands or refines a number of features. According to the vendor, version 3.0 allows more and larger mailing lists, more bulletin boards, global tagging of messages, blind carbon copies, extra formatting features in the text editor, and gateways to Telex, EasyLink, and Telemail on-line systems.

The Network Courier

Easy to learn and use, *The Network Courier* offers a good mix of message management, security, and connectivity features. Although the program doesn't top *cc:Mail*, the company's pricing scheme makes *The Network Courier* a better value for LANs with more than 25 users and for those who need connectivity options.

The program's numerous RAM-resident options should satisfy just about everyone. You can choose from the full-fledged standalone program, a 60K RAM-resident messaging version, and two small utilities (one resident and one not) that signal you when new mail arrives. An added plus: You can remove the programs from memory without rebooting the computer.

The Network Courier's *1-2-3*-style command line will make most users feel right at home; other options, message lists, and so on are typically relegated to pop-up windows. *The Network Courier* largely matches *cc:Mail*'s messaging features and adds some notable extras. For example, you can forward messages, have a message returned if it's not received, assign priorities (so that an urgent message is transmitted ahead of others), and dictate when messages are to be transmitted. Network administrators also have a fair

EXECUTIVE SUMMARY

The Network Courier

LAN E-mail package

With its solid lineup of messaging and security features, *The Network Courier* runs a close second to *cc:Mail*. Its reasonable price makes it a better deal for large networks with links to the outside world.

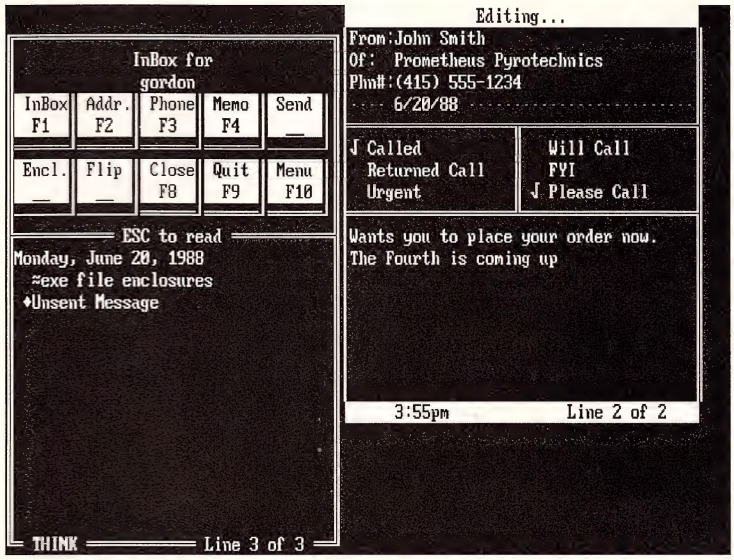
	POOR	FAIR	GOOD	EXCELLENT
Interface			●	
Messaging			●	
Message management				●
Text editing	●			
Connectivity				●
Overall value			●	

amount of control and can restrict read/write privileges, use of priorities, and gateway access. However, *The Network Courier* lacks a network bulletin board and doesn't permit user-defined mailing lists.

The Network Courier can attach any kind of file to a message, but messages themselves can incorporate only ASCII data cut from static files. Adding ASCII data is straightforward: Select a few menu options to display the file, highlight the data you want, and it's pulled into the message. If you want to import data from a *1-2-3* worksheet, though, you must exit *The Network Courier*, load *1-2-3*, load the worksheet, create a .PRN file, exit *1-2-3*, reload or reinvoke *Courier*, display the .PRN file, and then cut and paste data from that. It's a laborious process few users will subject themselves to.

Message management options are on a par with *cc:Mail*'s. You can sort messages by sender, subject, date, and priority. You can also tag messages and manipulate them at the same time.

The Network Courier shines when it comes to connectivity, and the options are often cheaper than *cc:Mail*'s. If you buy the $995, 150-user internetwork version, for example, you receive gateway software for accessing other LANs running *The Network Courier*. (cc:Mail, Inc., charges $1295 for the equivalent function.) Remote PCs can access the LAN with *Modem Mail Remote User* for only $95 per PC, but you'll need to install the $495 *Modem Mail Post Office* on the server. The company even offers a 150-user internetwork *Windows* version of the program, and a mixed *Windows*-based and character-based *Network Courier* setup. In short, if you've got a large network—or numerous connections with the outside computing world—*The Network Courier* is a superior choice.



Originally designed for the Macintosh, the character-based InBox/PC uses tiny icons to differentiate file types.

InBox/PC

Although Symantec stresses *InBox/PC*'s simplicity, it's not much easier to use than its more advanced rivals. At $99 for a three-user system and $599 for a 100-node setup, *InBox/PC* is a great deal for tiny and huge LANs. But work groups caught in between —say, a typical departmental LAN of 10 to 20 nodes—are penalized economically. However, *InBox/PC*'s poor file management features, lack of connectivity options, and absent on-line help probably won't attract many users anyway.

InBox/PC is based on a Macintosh version, but something got lost in the translation. Instead of a logical pulldown menu interface, you get a function key menu and a hodgepodge of <Alt>-*key* combinations. Inactive windows are not always cleared from the screen, making it difficult to figure out

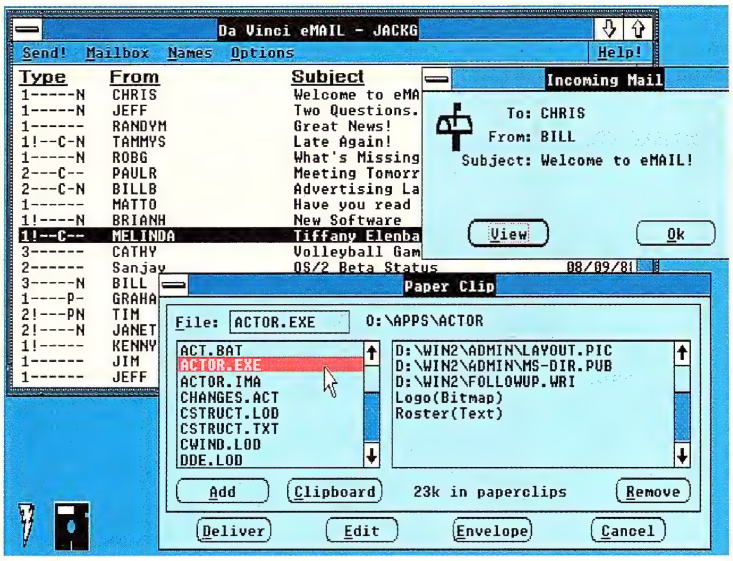
EXECUTIVE SUMMARY

InBox/PC

LAN E-mail package

Inexpensive and strong on essentials, *InBox/PC* lacks external links and falls short on file management. Its pricing scheme limits it to very small and very large LANs only.

	POOR	FAIR	GOOD	EXCELLENT
Interface			●	
Messaging				●
Message management	●			
Text editing	●			
Connectivity	●			
Overall value			●	



The Windows-based Da Vinci eMail uses icons to help you keep track of its profusion of windows.

what to do next, and the lack of on-line help further complicates matters.

In matters of messaging and file management, *InBox/PC* is a mixed bag. You get automatic file encryption, a LAN-wide bulletin board, an option that greets users with "news flashes" when they log on, customizable phone-message and memo forms, and an easy Rolodex approach to viewing messages. But crucial basics are lacking: Messages are limited to a single attachment, and you can't send carbon copies or sort messages by date or sender labels.

InBox/PC may be a bargain in certain situations, but its somewhat confusing interface, total lack of connectivity options, and relative dearth of features rule it out for most LANs. The company claims that a new version will feature folders, more file management options, and gateways to other systems. Until then, save your money.

Da Vinci eMail

Da Vinci eMail was the first E-mail program designed for *Windows*. Not surprisingly, it's the easiest package to use—and the slowest. *Da Vinci eMail* crawls on XTs and 8-MHz 80286 machines; even on a 386 computer the text editor is noticeably slow. When you factor in the company's pricing scheme and the program's lack of connectivity features, it's hard to recommend *Da Vinci eMail* to anyone except committed *Windows* users.

Before you consider *Da Vinci eMail*, take a hard look at your wallet. A five-user setup costs $445, a 20-user setup costs $895, and there are no price breaks for larger LANs. *Da Vinci eMail* requires a PC equipped with 640K of RAM, nearly 2MB of disk space (mostly for *Windows*), a graphics display, and a copy of *Windows*. For acceptable performance, though, you'll really need a fast 80286 or 80386 computer, 2MB of RAM, and an EGA or VGA display at each node.

Cost and speed issues aside, *Da Vinci eMail* is a pleasure to use. The mouse-driven, icon-oriented *Windows* interface has been sculpted to emulate traditional mail handling. To post a letter, for example, you place its icon in an on-screen envelope and attach files with a paper-clip icon.

You can't insert graphics directly into a message, but you can drop any image generated by a *Windows* application into the *Windows* clipboard and mail the clipboard. (If you want a graphic created with a DOS application, you can only capture and send the entire screen.) The recipient can view the image without having to run the original application.

EXECUTIVE SUMMARY

Da Vinci eMail

LAN E-mail package

A *Microsoft Windows* product, *Da Vinci eMail* has excellent features, but they are overshadowed by its high price, sluggish speed, and lack of connectivity options.

	POOR	FAIR	GOOD	EXCELLENT
Interface				●
Messaging			●	
Message management				●
Text editing	●			
Connectivity	●			
Overall value		●		

Da Vinci eMail's messaging and file management options are tops. You can assign three different priority ratings to messages and even encrypt messages with passwords. Pop up a dialog box, and you can sort and filter messages by sender and subject (or portions of either), priority, date, date range, carbon copy, read or unread status, and whether a paper clip was attached.

Though *Da Vinci eMail* is not recommended for LANs that haven't switched to *Windows*, keep your eyes open for a faster, cheaper, character-based version due before the end of the year and the addition of internetwork and on-line gateway options.

The LAN E-Mail Lineup

Price issues aside, *cc:Mail* is the clear winner in this review. Yet in the real world of tight budgets, the program's innovative extras (especially those found in version 3.0) may not be enough to keep you from choosing the very capable and cheaper *Network Courier*. If your network has 25 users or fewer, go with *cc:Mail;* if your network has numerous nodes and linking up with other systems is key, *The Network Courier* has the edge. If you're not ready to buy, wait out the market—all of the reviewed vendors have bigger and better (and even cheaper) updates coming.

Gordon Haberfelde is a cofounder of Micro-MRP, a Foster City, California, maker of PC-based manufacturing software.

WHERE TO BUY

cc:Mail 1.2
cc:Mail, Inc.
385 Sherman Ave.
Palo Alto, CA 94306
800/448-2500,
415/321-0430
List price: $695 for 25 users, $1290 for unlimited users; cc:Mail Gateway $1295 per network; PROFSlink $995; EasyLink $695; Telelink $695; cc:Mail Remote $100 to $295 per user based on number of users; cc:Mail Import/Export $995
Requirements: 280K, DOS 3.10 or a later version, IBM- or Epson-compatible printer
Not copy protected
Technical support: unlimited, toll-free number, M–F 8–5
Other support services: E-mail support for gateway and remote users
For more information, circle 640 on reader service card.

Da Vinci eMail 1.2
Da Vinci Systems
P.O. Box 5427
Raleigh, NC 27650
919/839-2000
List price: $445 for 5 users, $895 for 20 users
Requirements: 640K; DOS 3.00 or a later version; Windows 2.0, Windows/386, or a later version; graphics display; hard disk, 80286-based computer; mouse strongly recommended
Not copy protected
Technical support: unlimited, no toll-free number, M–F 9 a.m.–10 p.m.
Other support services: none
For more information, circle 641 on reader service card.

InBox/PC 1.24
Symantec Corp.
135 South Rd.
Bedford, MA 01730
800/64THINK,
617/275-4800
List price: $99 for 3 users, $599 for 100 users
Requirements: 256K, DOS 3.10 or a later version
Not copy protected
Technical support: unlimited, no toll-free number, M–F 9–5:30
Other support services: CompuServe forum (GO THINK)
For more information, circle 642 on reader service card.

The Network Courier 1.0
Consumers Software Inc.
314 E. Holly St. #106
Bellingham, WA 98225
800/663-8935,
604/688-4548
List price: $295 for 6 users, $695 for 100 users, $995 for 150-user internetwork (gateway) version; Modem Mail Post Office $495 per server; Modem Mail Remote User software $95 per user; Windows 2.0 internetwork version $995 ($1590 for mixed Windows and non-Windows); PROFS mainframe gateway $5000; PROFS LAN server gateway $1000; MCI Link $695 per server; All-in-1 Link (to DEC VMS networks) $2500 (host), $2500 (server)
Requirements: 192K, DOS 3.10 or a later version
Not copy protected
Technical support: unlimited, no toll-free number, M–F 8–6
Other support services: E-mail support for internetwork users, 30-day money-back guarantee
For more information, circle 643 on reader service card.

In Search of Forgotten Text

When your hard disk is overrun with files, finding data can be tough.

Here are five software sleuths to help you track down lost text.

George Beinhorn

Hard disks, like closets, weren't built with disorganized people in mind. Crucial information gets hidden easily under obscure file names or in forgotten subdirectories. Fortunately for those of us who lack photographic recall, there's a quick way to locate lost data. Using text retrieval programs you can search an entire hard disk for information and then edit or print retrieved material. *PC World* evaluates five of these text fetchers: *ZyIndex*, *SearchExpress*, *Memory Lane*, *Gofer*, and *The Text Collector*.

Text retrieval programs fall into two categories—those that index and those that don't. Indexing programs like *ZyIndex*, *Memory Lane*, and *SearchExpress* create a list of all the unique words in a text file and chart a path to them, much like data base management software. Building an index takes time and eats up disk space, but once the index is built, finding data is a breeze. In contrast, nonindexing programs such as *Gofer* and *The Text Collector* search sequentially through a file until they find the target word or phrase. This makes them better suited for searching smaller amounts of text.

Here are some other factors to keep in mind when matching text retrieval software to your particular needs: Does the program require document conversion, or can it read documents in their native file formats? Is the program a TSR or a stand-alone? How much memory and disk space does the program devour? Finally, how competent is the software's cut-and-paste feature?

ZyIndex Professional 3.0

ZyIndex Professional is a powerful text retrieval program with an interface honed to essentials. The $295 program requires indexing, so you wouldn't want to use it to track drafts that frequently change while you scurry to meet a tight deadline. Big, static text archives are the program's forte.

ZyIndex uses separate programs for indexing and searching. In practice this isn't as inconvenient as it sounds. Building an index is straightforward: You enter a target subdirectory, identify the file format, and mark the files to be indexed. Each index occupies about 20 percent of the space of the original file.

ZyIndex indexes files stored in a variety of formats including *1-2-3*, *dBASE*, and *WordStar*. But to create multiflavored indexes you must index each file format separately.

Once your oldies but goodies are indexed, *ZyIndex* makes searching a breeze. Like all the programs reviewed, *ZyIndex* searches can include Boolean OR, AND, and NOT operators. Searches can contain wild cards, and you can use DOS file-creation dates and

ANDREW SHACHAT

file names in your requests. To locate a lost file, simply type the file name instead of entering a text string. *ZyIndex* can also search several indexes at once.

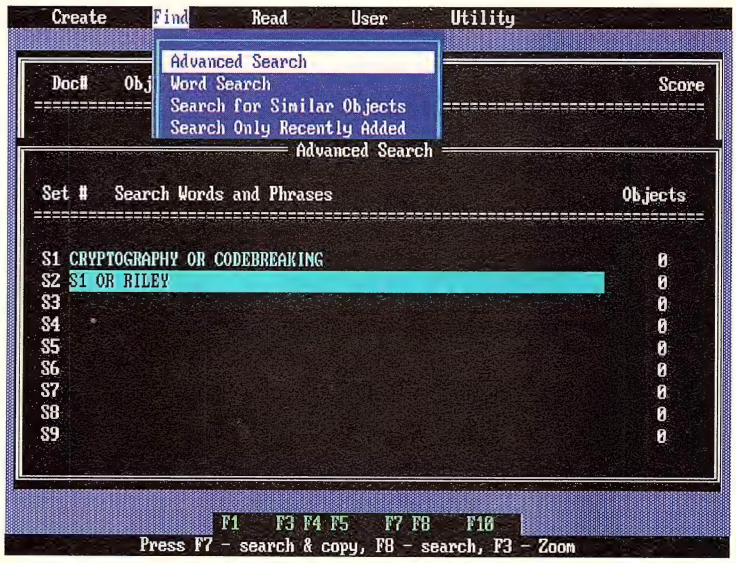
Once you've made your search, displaying the results is similarly painless—one keystroke displays a neatly formatted list of retrieved files. Make a selection and *ZyIndex* displays the first 16 lines of text. You can move forward or backward and jump directly to the next and previous hits. To cut and paste a block to your application, simply mark it and save it to an ASCII file. *ZyIndex* can include the name and date of the source file in a saved block, along with the search request and a memo of up to 60 characters.

The indexing program's speed is barely adequate: It took more than 9 minutes to index a 32K file on a 4.77-MHz PC with a hard disk. Once the index is set up, search speed is a little more impressive; *ZyIndex* took only 10 seconds to set up the search and find the first hit.

ZyIndex Professional is a nice blend of search power and ease of use. For added search flexibility, *ZyFeatures*, a $95 add-on, enables you to attach fields such as date and time to indexed files and create search macros. *ZyIndex*'s excellent design and modest disk space requirements make it the quintessential text-archiving program for seldom-changing file collections.

Memory Lane 2.0

Although *Memory Lane* also requires indexing, the $99 program goes *ZyIndex* one better. Once you've indexed files, *Memory Lane* sits in RAM like a traffic cop, tracking file changes and noting them in its to-do list. Whenever it's convenient, you can choose files from the list for indexing. Alternatively, *Memory Lane* automatically indexes all new or changed files in the background when it sees the DOS prompt. The only hint of *Memory Lane*'s presence in RAM is an almost imperceptible slowing of disk saves.



SearchExpress offers extensive search options, but you need to convert your files into the program's proprietary format.

Memory Lane is fast: It indexed a 32K file in 43 seconds. The program is also extremely economical in its use of disk space. When 1MB or more of data is indexed, the index file is just 15 percent of the size of the source files. Installing the program to use up to 30 percent overhead yields faster searches.

Memory Lane's search features are easy and versatile. You can search unindexed as well as indexed files. *Memory Lane* also lets you restrict searches to files created under a single program (such as *Microsoft Word*) and organize indexed files according to subject categories you define.

The program lets you scroll through the retrieved text and jump to the next and previous hits. Cutting and pasting is easy: You simply mark a block with the arrow keys, return to your application, and press <Alt>-P to insert the text. Remarkably, *Memory Lane* detects the file formats of both the cut block and the underlying document and automatically performs required data translations. This conversion feature supports over 20 popular word processor, data base management, and spreadsheet programs.

With its excellent speed, RAM residency, frugal use of disk space, flexible search capabilities, and reasonable price tag, *Memory Lane* offers the best balance of cost, power, and features of the programs reviewed.

EXECUTIVE SUMMARY

ZyIndex Professional 3.0

ZyIndex's uncomplicated design and more-than-adequate search options make it a good choice for office text files that don't change frequently.

	POOR	FAIR	GOOD	EXCELLENT
Import/Export				●
Indexing			●	
Searching			●	
Retrieval			●	
Overall value			●	

SearchExpress 2.30

Apparently designed for librarians and other professional information jockeys, *SearchExpress*'s investigatory powers outclass office-level retrievers such as *Memory Lane* and *Gofer*. You can, for example, attach user-defined fields to graphics files and index them for later retrieval. But power, in this case, has a price—$349 and 450K RAM. Add huge disk-space overhead and poky indexing to the high price tag, and the *SearchExpress* audience may drop to a select few.

Unlike with the other programs reviewed, you must translate your documents into the program's format before *SearchExpress* can root through them. *SearchExpress* took over 11 tedious minutes to convert and index a 32K *WordPerfect* file. Disk overhead for indexes amounts to 50 to 70 percent of the space occupied by the original file, far more than is required by either *Memory Lane* or *ZyIndex*. And while indexing, *SearchExpress* requires temporary workspace 2 to 10 times the size of the input file; a 2MB file can consume up to 20MB.

The program's simple menu interface belies its extensive search facility. You can search on up to nine statements or just a single word. Once it completes a search, *SearchExpress* displays the number of files that satisfy each request. In single-word searches, you can rank the retrieved files according to the number of occurrences. *SearchExpress* can also analyze a group of files for frequently occurring words and then search for files whose text content is similar.

Retrieved documents are displayed in a document summary screen, where they're available for browsing. You can view the full text of retrieved files with search terms highlighted, then look at paragraphs or sentences containing search terms. However, *SearchExpress* has no cut-and-paste feature. You must use your word processor to open the file, find the text, and move it.

SearchExpress has extensive search capabilities, but unless you really need that kind of power, the program's system requirements, slow indexing, and lack of a text-transfer capability will leave you yearning for something faster and simpler.

Gofer 1.0

Gofer couldn't be more aptly named. It's an easy-to-use $79.95 program that snoozes in RAM until you whistle, then races down hard-disk burrows to chase after lost blocks of text.

When you press its hot key, *Gofer* displays two windows: one requesting the 'text to Go For', and a main menu with seven choices. At this point, you simply enter a search request—up to eight 20-character text strings—and the hunt begins. The program took 15 seconds to make its first hit in a 32K file.

EXECUTIVE SUMMARY

Memory Lane 2.0

BEST BUY

Memory Lane has it all: TSR operation, vast file capacity, auto-indexing, a lucid interface, terrific speed, and flexible configuration options.

	POOR	FAIR	GOOD	EXCELLENT
Import/Export				●
Indexing				●
Searching			●	
Retrieval				●
Overall value				●

FEATURES EVALUATION

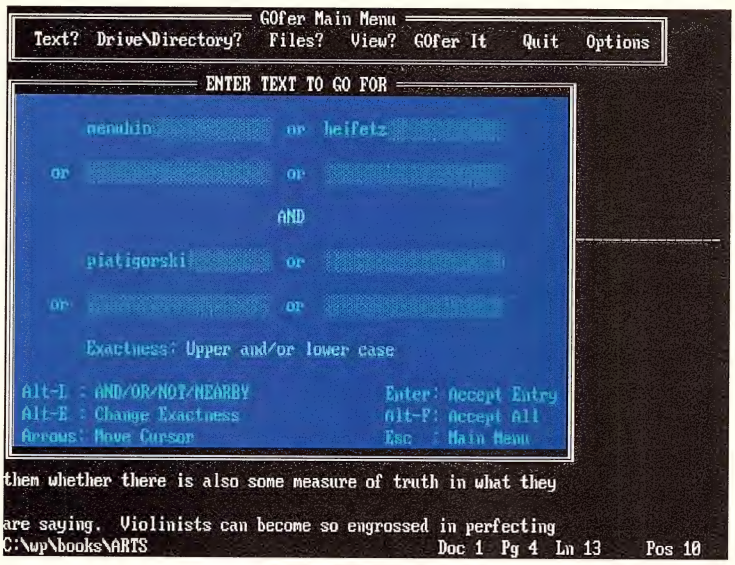
Text Retrieval Software

Memory Lane blends versatility with usability for top-notch file searches.

● Yes
○ No
△ Limited only by disk capacity

	Zylndex Professional 3.0	Memory Lane 2.0	SearchExpress 2.30	Gofer 1.0	The Text Collector 1.5
Standard features					
RAM required	448K	100K	450K	91K	128K
TSR mode	○	●	○	●	○
Maximum files	5000[1]	7500	1 million	△	△
Maximum document size (pages)	300[2]	△	△	△	△
Import/export					
Performs without file conversion	●	●	○	●	●
ASCII	●	●	●	●	●
EBCDIC	●	●	●	●	○
1-2-3	●	●	○	●	○
dBASE	●	●	○	●	●
WordPerfect	●	●	●	●	●
Microsoft Word	●	●	●	●	●
Data indexing					
Automatically indexes multiple file formats	○	●	●	n/a	n/a
Optimizes index file size	●	●	●	n/a	n/a
Lists all indexed files	●	●	●	n/a	n/a
Tracks file changes	●	●	○	n/a	n/a
Searching					
Searches across subdirectories	●	●	●	○	●
Searches across multiple indexes	●	○	○	n/a	n/a
Searches unindexed files	○	●	○	●	●
Boolean searches	●	●[3]	●	●	●
Proximity searches	●	●	●	●	○
Wild-card searches	●	●	●	●	●
Sound-alike searches	●	○	●	●	●
Searches user-defined fields	●[4]	○	●	○	●
Searches by file-creation date	●	●	●	○	●
Browse feature	○	○	○	●	●
Saves search criteria	○	○	●	○	●
Retrieval					
Cuts and pastes	●	●	○	●	●
Appends text to existing file	●	○	○	●	●
Inserts headers/search date	●[4]	●	●	○	●
Prints sentences containing keywords	○	○	●	○	●
Prints paragraphs containing keywords	○	○	●	○	●

[1] Per index list.
[2] Approximately; actual limit is 65,536 unique words per document.
[3] Two passes required for NOT searches.
[4] Requires separate program.



Gofer pops up in RAM for convenient searching; however, it searches only one directory at a time.

Gofer's search capabilities are limited compared to other programs'; for example, you can search only one directory and its subdirectories at a time. Once the program has scored a hit, you can send finds to disk, to a printer, or just have *Gofer* summarize the number of finds in each file. You can also browse files without searching—for instance, to peek at a spreadsheet from your word processor.

A file-compression utility squeezes files by as much as 50 percent and lets you search and export text from the compressed files. *Gofer* can search files from up to ten popular application programs, including *1-2-3*, *dBASE*, *Q&A*, *Word*, *WordPerfect*, and any application that generates ASCII or EBCDIC files.

Gofer has the feel of *simpatico* software—a combination of thoughtful design, versatility, speed, and real-world usefulness. For monster file collections, indexing programs are faster. But for searching groups of files that occupy less than 1MB, *Gofer* is hard to beat.

The Text Collector 1.5

The Text Collector is a $69 stand-alone program that could give *Gofer* a run for the money in the nonindexing text retrieval race. In our tests it took only 10 seconds to make its first hit in a 32K file. But the program hides its speed and extensive features behind a perplexing interface.

The Text Collector's opening menu is deceptively compliant—screens pop up crisply, and a set of shortcut commands lets you speed through the menus. The menu prompts you for a search string, an input file, and an output file. But after that things get complicated; the menu's three choices lead to a labyrinth of options that'll send you scurrying for the manual.

The Text Collector lets you save and recall an amazing cornucopia of defaults including search criteria, names of files to search, and output parameters. It can sort output files, search files according to date, and limit searches to a range of dates. Unlike *Gofer*, *The Text Collector* also performs single searches across several drives and paths. It isn't easy, given *The Text Collector*'s unintuitive syntax and program structure, but it can be done.

Once you've uncovered data, however, the program's cut-and-paste feature is burdensome at best. *The Text Collector* writes its finds either to an output file in a *context block* (a word, sentence, or paragraph surrounding each find) or to a block you define with special delimiters. To write an amorphous, nondelimited chunk of text to an output file, you must locate the text, enter the browse mode, tell the program to format the file in context blocks (paragraphs, for example), and finally write the blocks you want to the output file.

EXECUTIVE SUMMARY

SearchExpress 2.30

Designed for super flexible retrievals from large, static file collections, *SearchExpress*' s conceptual advantages rapidly lose their appeal the first time you use its s-l-o-w indexing routine. The absence of a cut-and-paste feature is a glaring oversight.

	POOR	FAIR	GOOD	EXCELLENT
Import/Export			●	
Indexing		●		
Searching				●
Retrieval			●	
Overall value			●	

The Text Collector forces you to learn its ways. The reward for your struggle is fast, flexible searching—but only if you've got the patience.

Remembrance of Text Past

Choosing the right text retrieval software depends on the shape of your pool of words and how often you need to fish through it. *ZyIndex* offers acceptable speed and is especially adept at plucking text from static files. *Memory Lane*'s auto-indexing and RAM residence are unsurpassed for searching through constantly changing files. *SearchExpress* is harder to use and better suited to managing unchanging, oceanic file collections than subdirectories full of letter drafts and reports. *Gofer* is a likable little rascal, a hard-disk bike messenger with unexcelled short-distance power. And *The Text Collector*, though hard to learn, provides an immense variety of options for fast, non-TSR file searching. Next time you need to ferret out a lost bit of data, try a text retriever.

George Beinhorn is a freelance writer in North San Juan, California.

EXECUTIVE SUMMARY

Gofer 1.0

Gofer is the choice for fast, fuss-free, nonindexed TSR scanning of subdirectories and floppies for the occasional mislaid file. For large text collections, however, an indexing program is faster.

	POOR	FAIR	GOOD	EXCELLENT
Import/Export				●
Indexing (n/a)				
Searching			●	
Retrieval			●	
Overall value			●	

EXECUTIVE SUMMARY

The Text Collector 1.5

It takes rugged dedication to survive *The Text Collector*'s confusing maze of menu options, but the reward is fast, nonindexed searches with extremely flexible output formats. However, the cut-and-paste feature is much too rigid.

	POOR	FAIR	GOOD	EXCELLENT
Import/Export			●	
Indexing (n/a)				
Searching				●
Retrieval			●	
Overall value			●	

WHERE TO BUY

Gofer 1.0
Microlytics
300 Main St.
East Rochester, NY 14445
800/828-6293, 716/377-0130
List price: $79.95
Requirements: 91K, DOS 2.00 or later version
Not copy protected
Technical support: unlimited, no toll-free number, M–F 8:30–5:30
Other support services: none
For more information, circle 700 on reader service card.

Memory Lane 2.0
Group L Corp.
481 Carlisle Dr.
Herndon, VA 22070
703/471-0030
List price: $99
Requirements: 100K, DOS 2.00 or later version
Not copy protected
Technical support: unlimited, no toll-free number, M–F 9:30–5
Other support services: none
For more information, circle 701 on reader service card.

SearchExpress 2.30
Executive Technologies, Inc.
2120 16th Ave. S
Birmingham, AL 35205
205/933-5494
List price: $349
Requirements: 450K, 500K of disk space
Not copy protected
Technical support: unlimited, no toll-free number, M–F 8–5
Other support services: on-site training $75/hr.
For more information, circle 702 on reader service card.

The Text Collector 1.5
O'Neill Software
P.O. Box 26111
San Francisco, CA 94126
415/398-2255
List price: $69
Requirements: 128K, DOS 2.00 or later version
Not copy protected
Technical support: unlimited, no toll-free number, M–F 9–5
Other support services: none
For more information, circle 703 on reader service card.

ZyIndex Professional 3.0
Zylab Corp.
3105-T N. Frontage Rd.
Arlington Heights, IL 60004
312/632-1100
List price: $295
Requirements: 448K, DOS 2.00 or later version, two disk drives (hard disk recommended)
Not copy protected
Technical support: unlimited, no toll-free number, M–F 8–6
Other support services: none
For more information, circle 704 on reader service card.

Project Management—For Professionals Only

Project management software can help you plan, schedule, track, and report on an army of resources.

But it's not a casual management tool.

Woody Liswood

When project management software first came out, it was touted as the latest and greatest general problem-solving tool. But this category of software continues to appeal mostly to project management professionals. A product that's intuitive enough to hook a more general audience has yet to be developed—with the possible exception of *Insta-Plan* (see *The Software Shelf, PCW,* April 1988).

Still, the serious project manager can select from an excellent assortment of mid-range tools. Unlike high-end vertical packages such as *Primavera*, these programs are relatively inexpensive and are geared toward professionals with generic project-management needs. In this review, *PC World* evaluates four of the most popular project managers that cost less than $700—*SuperProject Expert 1.1, Time Line 3.0, Harvard Total Project Manager II 2.0,* and *Microsoft Project 4.0—as well as Micro Planner 6,* a popular Macintosh product now available under *Windows.*

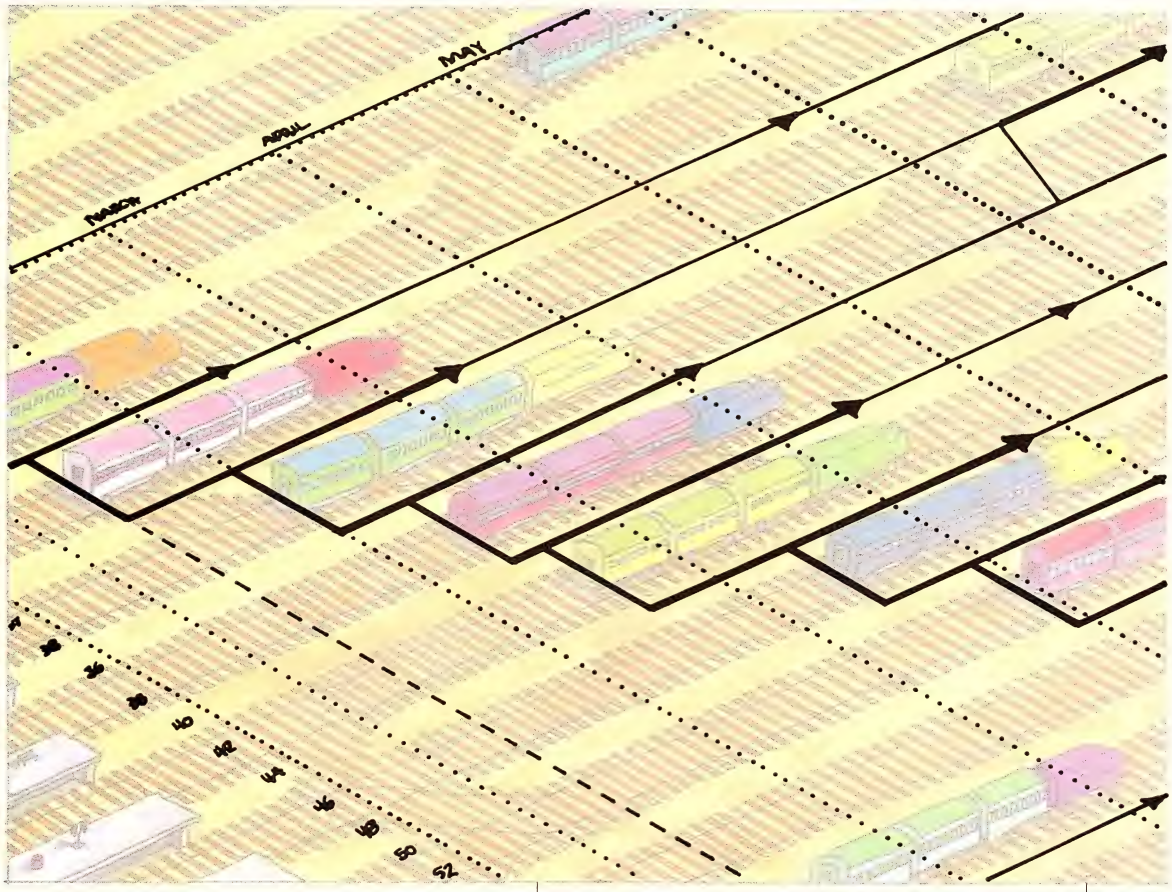
The Purchase Decision

Most of these products offer the four staple features of project management: the Gantt chart, the PERT chart, the critical path method (CPM) diagram, and the work breakdown structure (WBS) flowchart. Two of the programs, *SuperProject Expert* and *Time Line*, conveniently allow text entry and editing in a hierarchical outline. *Micro Planner,* in keeping with the Macintosh model, takes a unique graphic approach to project planning.

In addition to carefully considering a program's interface, buyers should appraise its capacity—the number of tasks it supports. *SuperProject Expert* is the clear winner in this category, allowing up to 2800 tasks in expanded memory.

Another key feature is resource management. Programs should be able to allocate a resource by the hour or by the minute and then schedule it flexibly over the lifetime of a given task. All the products reviewed have this ability, to various degrees. The programs also allow you to compare a baseline plan with actual resource use and costs.

Finally, superior reporting is critical for tracking a project's progress. All the programs offer standard report formats as well as custom-design capabilities. They all work with laser printers and plotters, but their support for color printers and sideways printing is spotty.



SUSAN HUNT YUE

SuperProject Expert 1.1

For $695, you can have the most complete and complex package reviewed—*SuperProject Expert*. As an example of its flexibility, you can build a project from an outline, PERT chart, Gantt chart, or WBS, and switch between these views with a couple of keystrokes.

The program has a unique method of developing a PERT chart. When you create a task, the PERT box appears on screen. You then define the links between that task and all others and, using the cursor keys, position the box within the PERT network as you see fit. You can even forecast the probability that the task will be completed on schedule and then generate a report showing best-case, worst-case, and on-schedule scenarios.

SuperProject Expert provides a host of advanced scheduling features, such as the ability to split a variable resource assignment between two simultaneous tasks. The package supports resource leveling among linked subprojects; alternatively, you have the option of specifying that certain projects not be leveled.

You can have over 100 reporting fields, including task name, cost, duration, and rates. Version 1.1 adds the Cost/Schedule Statistics Report required of government contractors. The program prints reports sideways, but you must print first to disk and then use *Sideways* from the DOS prompt.

SuperProject Expert has three menu levels, from novice to expert, and a macro language complex enough to let you develop tutorials or automate visual displays. The program supports expanded memory and works on a LAN. An OS/2 version is available for $795. *SuperProject Expert*'s complex options may at first seem daunting, but if you need power and capacity it's the program of choice.

FEATURES EVALUATION

Project Management Roundup

In features and capacity, SuperProject Expert leads the pack.

● Yes
○ No
◒ Deficient
△ Limited only by available RAM

	SuperProject Expert 1.1	Time Line 3.0	Micro Planner 6	Harvard Total Project 2.0	Microsoft Project 4.0
Project analysis					
Maximum no. of tasks per project	1560	1000	1340	350	750
Maximum in expanded memory	2800	1600	1340	n/a	n/a
Maximum no. of resources per project	△	300	26	100	255
Maximum no. of resource calendars	△	1	26	1	255
PERT/Gantt/critical path method	●	●	●	●	●
Work breakdown structure (WBS)	●	◒[1]	○	●	●
Best-/worst-/most-likely-case estimates	●	○	○	○	○
Resource leveling	●	●	●	●	●
Leveling within subprojects	●	●	◒[2]	●	○
Leveling over multiple projects	●	●	●	●	○
Data entry and editing					
Mainframe program links	●	○	○	○	○
Outliner	●	●	○	○	○
Mouse support	○	○	●	○	●
Notes	●	●	○	●	●
Undo command	○	●	○	○	○
Macro capability	●	●	○	○	○
Imports					
ASCII	●	◒[3]	◒[2]	○	●
.WK1 or .WKS	●	○	○	○	○
.DBF	●	○	○	○	○
.CSV	●	○	○	○	○
Exports					
ASCII	●	●	●	●	●
.WK1 or .WKS	●	●	○	●	●
.DBF	●	●	○	●	●
.CSV	●	●	○	●	○
Reporting					
On-screen reports	●	●	●	○	●
Reports resources/costs by activity	●	●	●	●	●
Reports on actual vs. projected plan	●	●	●	●	●
Produces earned-value analysis	●	●	●	●	●
Supports color printers	●	○	●	●	○
Supports plotters	●	◒[4]	●	●	●
Supports sideways printing	●	◒[5]	●	●	●

[1] WBS codes are supported, but the WBS itself is not visible on screen.
[2] Requires Project Exchange, a $100 add-on.
[3] Outlines in ASCII format can be imported.
[4] Requires Time Line Graphics, a $195 add-on.
[5] Only in compressed mode on the LaserJet.

EXECUTIVE SUMMARY

SuperProject Expert 1.1

Project management software

This feature-rich product supports up to 2800 tasks in expanded memory and provides great flexibility for assigning and tracking resources.

	POOR	FAIR	GOOD	EXCELLENT
Project analysis				●
Data entry and editing				●
Reporting				●
Overall value				●

Time Line 3.0

Time Line's forte is its easy-to-use interface. In addition, the $595 program sports full outline control, a note-taking feature, macros, and handy data entry and what-if features such as an undo/redo command.

After you enter tasks, *Time Line*'s convenient forms-oriented system prompts you to fill in data about the project, each task, and each resource. Although you can't work in a WBS as you can in *SuperProject Expert* and *Harvard*, you can enter a WBS code when you create tasks and then filter the tasks using that code.

Time Line will maintain up to 300 resource or cost categories. Resource leveling can be accomplished for all tasks in memory at the same time. However, if you wish to level subprojects, they must all fit within *Time Line*'s 1000-task limit (1600 tasks in expanded memory).

Time Line's default calendar contains the standard federal government holidays. But the program doesn't allow you to create a separate calendar for each resource, which can present problems for long-term projects and vacation scheduling. There's a kludgy work-around, but flexible calendars really should be integral.

The program contains five standard report formats that can be customized extensively. *Time Line Graphics*, a separate $195 module, provides plotter support and allows you to

print bit-mapped graphics and time-scaled PERT charts. A LAN version of *Time Line* is available for $595 plus $195 for each additional node.

For years *Time Line* and *SuperProject Expert* have been playing leapfrog for leadership in this software category. At the moment, *SuperProject Expert* has a slight edge in terms of capacity, while *Time Line*'s somewhat more intuitive interface is its strong point. Both programs are an excellent value and are capable enough to appeal to the professional project planner.

Micro Planner 6

The $595 *Micro Planner* was originally a Macintosh program but now runs under either *Windows 2.0* or *Windows/386*. If you're used to traditional project management on a PC, *Micro Planner* will come as a surprise. It uses a graphic, PERT-type interface for project design. To insert a task into a chain of events, for example, you click the mouse on an event "circle" and then stretch a line forward or backward, depending on whether the activity precedes or follows that event.

Modifying a *Micro Planner* chart can be a pain. In one plan, I wound up with an unconnected node that would not delete. When I tried to analyze the plan, the program told me the node wasn't connected and wouldn't let me continue—a real catch-22. Also, you can't move a block of related activities from place to place. *Project Exchange*, a $100 add-on that was under development at press time, is supposed to add this capability (and others).

Micro Planner handles up to 1340 activities and a maximum of 26 resources per project. But sometimes its procedures are unusual. For example, *Micro Planner* uses a special activity type known as a *hammock* to summarize tasks. This acts something like a subproject but is more limited; unlike with the other programs, you can't store subprojects separately on disk. Strictly speaking, *Micro Planner* is not a multiuser application; although it will run on a LAN, at press time all multiuser features were still under development.

Among project managers, *Micro Planner* is a middleweight. On the positive side, it offers numerous activity types, its *Windows* interface makes for excellent graphics and printer support, and its files work with the Macintosh version. But *Micro Planner* lacks *SuperProject Expert*'s capacity and flexibility, and the interface is a challenge if you're used to more traditional approaches.

Using Harvard's task list is like using a Gantt chart in other programs, except the Gantt isn't provided automatically. Tasks can be edited and filtered in this view.

Harvard Total Project Manager II 2.0

Harvard Total Project Manager II version 2.0 is an easy-to-use $595 package geared for midsize projects. Its *PFS*-style pulldown menus make using the program almost like working within the *Windows* environment.

EXECUTIVE SUMMARY

Time Line 3.0

Project management software

Along with an easy-to-use interface, *Time Line* provides excellent data entry tools and supports up to 1600 tasks in expanded memory. However, resource calendars aren't available.

	POOR	FAIR	GOOD	EXCELLENT
Project analysis				●
Data entry and editing				●
Reporting				●
Overall value				●

EXECUTIVE SUMMARY

Micro Planner 6

Project management software

Micro Planner, a *Windows* product, takes a nontraditional approach to project management. Although its graphics and output are excellent, it makes the user adjust to its ways.

	POOR	FAIR	GOOD	EXCELLENT
Project analysis			●	
Data entry and editing			●	
Reporting			●	
Overall value			●	

A planner can work from PERT, Gantt, or WBS formats, but the default method is WBS. Working from a *Harvard* task list is like working from a Gantt chart in the other programs, except that on-screen Gantt graphics aren't automatically provided. Within *Harvard*'s actual Gantt chart you can edit and create tasks, but you can display only a few tasks at a time.

Only one calendar is available per project. However, you can enter resources and costs in just about any way that makes sense, and subprojects and resource leveling are both supported.

Project reporting is integrated, and *Harvard* provides 24 predesigned formats. If you want custom reports, you select the columns you wish in any order, then sort alphabetically, numerically, chronologically, or by special user-defined codes. Laser printers, plotters, and sideways printing are all supported. Like *Micro Planner*, *Harvard* can work on a LAN but doesn't provide any multiuser capabilities.

A new version of the program, renamed *Harvard Project Manager 3.0*, was announced at press time, too late to be included in this roundup. According to Software Publishing, the new version retails for $695 and includes a WBS outline, unlimited resource calendars, data import, graphics scaling, automatic report templates, expanded memory support, and a simplified interface feature (see *Product Outlook* in this issue for more details).

Microsoft Project 4.0

The latest version of *Microsoft Project* offers all the necessities for competent project design, including resource leveling, filtering, custom reporting, and plotter support. The program runs on a LAN and includes an import/export facility for *Primavera* files.

Like the other programs, the $495 *Microsoft Project* works from a task/Gantt view as well as from a PERT chart. As you add tasks, you can call up resource screens and enter costs. However, resource allocation is not as flexible as in *SuperProject Expert*—you can't assign a resource to work variable hours over a task's duration. Subproject support is adequate but somewhat rigid. You must create each subproject separately, save it to disk, then link it into the main project. Resource leveling is not supported within subprojects. If dates are changed in the master project after leveling, the planner must update all subprojects manually.

Microsoft Project's reporting module contains 18 standard reports and a new report writer that lets you custom-design reports and templates. A sideways-printing feature is also provided. For project planners who don't require support for thousands of tasks, extensive flexibility, or resource leveling within subprojects, *Microsoft Project* is a good, economical choice.

EXECUTIVE SUMMARY

Harvard Total Project Manager II 2.0

Project management software

Harvard is a fine midrange program that supports up to 350 tasks per project and provides very good graphics and reporting. An upgrade, close to release at press time, promises even better value.

	POOR	FAIR	GOOD	EXCELLENT
Project analysis			●	
Data entry and editing			●	
Reporting			●	
Overall value			●	

Satisfying a Planner's Needs

SuperProject Expert is complex, but it's a winner for large projects requiring super flexibility. *Time Line* follows close behind and sports a simpler interface. *Micro Planner* offers power under *Windows* but breaks tradition with its graphic interface and unusual terminology. *Harvard* and *Microsoft Project* are both capable programs at midrange, but they can't handle larger projects.

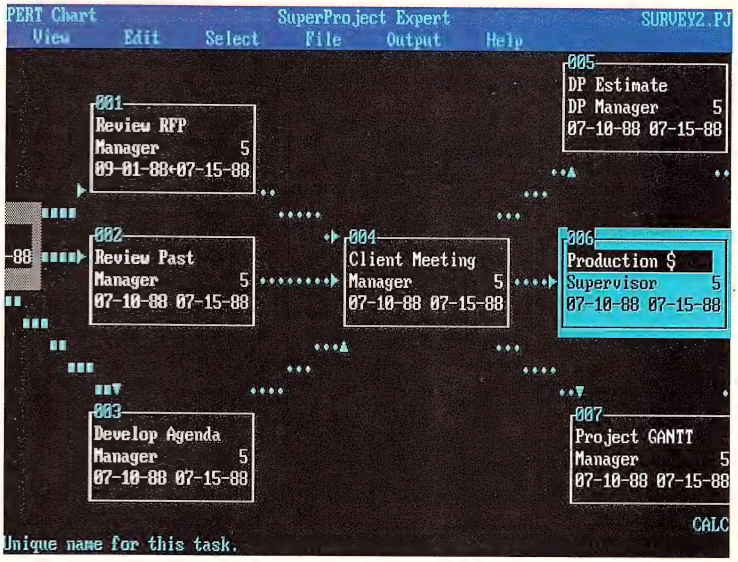
EXECUTIVE SUMMARY

Microsoft Project 4.0

Project management software

Microsoft Project 4.0 carries up to 750 tasks and sports a new report writer, plotter support, and resource leveling. What it lacks is extensive fine-tuning for resources.

	POOR	FAIR	GOOD	EXCELLENT
Project analysis			●	
Data entry and editing			●	
Reporting			●	
Overall value			●	



If you're in charge of complex projects, project management software can help keep you on schedule and within budget. But despite optimistic claims to the contrary, most packages require more time to set up and use than the average manager will be willing to spend.

Woody Liswood is a human resource consultant in New York City.

With SuperProject Expert's interactive PERT chart, you can define links between tasks and use the cursor keys to position each task box.

WHERE TO BUY

Harvard Total Project Manager II 2.0
Software Publishing Corp.
1901 Landings Dr.
Mountain View, CA 94039
415/962-8910
List price: $595, instructor training materials $199
Requirements: 512K, hard disk, DOS 2.00 or later version
Not copy protected
Technical support: unlimited, no toll-free number, M–F 7:30–4:30
Other support services: 30-day money-back guarantee, newsletter, authorized training through Egghead Discount Software
For more information, circle 690 on reader service card.

Micro Planner 6
Micro Planning Int'l
235 Montgomery St. #840
San Francisco, CA 94104
415/788-3324
List price: $595, Project Exchange add-on $100
Requirements: 512K, hard disk, DOS 3.xx or later version, hard disk, Microsoft Windows
Not copy protected
Technical support: free for 90 days, then $100 per year, no toll-free number, M–F 8–6
Other support services: free newsletter, training available for a fee
For more information, circle 691 on reader service card.

Microsoft Project 4.0
Microsoft Corp.
16011 N.E. 36th Way
Redmond, WA 98073
800/541-1261, 206/882-8080
List price: $495, Node Pack for networks $245 each
Requirements: 256K, DOS 2.00 or later version; hard disk recommended
Not copy protected
Technical support: unlimited, no toll-free number, M–F 6–6
Other support services: newsletter, third-party training
For more information, circle 692 on reader service card.

SuperProject Expert 1.1
Computer Associates
1240 McKay Dr.
San Jose, CA 95131
800/531-5236 (sales), 408/432-1727 (information)
List price: $695, LanPak for three additional users $695, OS/2 version $795
Requirements: 512K, DOS 2.00 or later version; hard disk recommended
Not copy protected
Technical support: free for six months, no toll-free number, M–F 7–5; then $195 per year including toll-free telephone support, free upgrades, and user BBS
Other support services: newsletter, training
For more information, circle 693 on reader service card.

Time Line 3.0
Symantec
10201 Torre Ave.
Cupertino, CA 95014
408/446-9994 (information), 408/253-9600 (sales)
List price: $595, LAN version $595 for file server plus $195 for each node; Time Line Graphics $195
Requirements: 640K, hard disk, DOS 2.00 or later version; AT-class machine or better recommended
Not copy protected
Technical support: unlimited, no toll-free number, M–F 8–5
Other support services: user BBS, newsletter, training
For more information, circle 694 on reader service card.

Multitasking Without OS/2

Why wait for OS/2? Why abandon your familiar DOS applications?

Four operating environments use the virtual 8086 mode of Intel's 80386 microprocessor to offer DOS multitasking today.

Michael Goodwin

Businesspeople often fantasize being able to do two (or more) things at the same time—especially around 3:15 on Friday afternoon. As it happens, the "virtual 8086" mode built into Intel's 80386 microprocessor provides that very ability. With the proper operating environment to serve as arbitrator, the chip allows multiple DOS sessions to proceed at once, each in its own memory partition—or virtual machine (VM). Each partition acts like a separate PC, with its own memory-resident programs, memory size (up to 640K), and AUTOEXEC.BAT file.

DOS users who don't want to wait for OS/2 applications to emerge from programmers' workrooms can take advantage of four multitasking 80386 environments right now: *Windows/386*, *Desqview*, *VM/386*, and PC-MOS/386. All four let your computer work in the background—recalculating a spreadsheet, or sending a file over the modem—while you write a report or add sales figures in the foreground.

PC World takes a hard look at each of these operating environments in terms of installation, performance, usability, and compatibility with DOS applications. In the final analysis, *Desqview* comes up the clear winner.

Certain similarities unite the systems. In addition to running multiple DOS sessions, all four prevent program conflicts and allow you to switch among programs. All access extended memory; the more RAM there is in your computer, the more VMs you can install. All but *Windows* allow you to adjust time slicing (the percentage of processor time allocated to foreground and background sessions), which enables you to maximize foreground performance.

On the downside, applications run more slowly under all four environments than they do under DOS. Multitasking always degrades performance; there's just no way to run two CPU-intensive tasks at the same time without slowing both of them down. But all these environments slow down applications (to varying degrees) even when there's nothing happening in the background.

To evaluate performance, I ran two informal tests on each environment. First, to find out how much each environment slowed performance in a best-case, single-tasking scenario, I conducted a test suite—running a DIR in a crowded subdirectory, copying four 250K files in DOS, and executing a lengthy search-and-replace in *WordStar 4.0*—all with no background activity. Then I ran the same suite as a multitasking test, with two CPU-intensive tasks (loops that counted from 1 to 1 million in compiled QuickBASIC 4.0) run-

ning in background windows. Default time slicing was used for all multitasking tests.

Usability is just as important as performance, and here the environments vary widely. For instance, the virtual 8086 mode lets only one VM access a given COM port at a time. Two of the environments swap the port automatically when you move from one VM to another, while two require you to make the exchange manually. Two insist that you generate a program information file (PIF) before you can run a DOS application for the first time, and two do not. Two support cut and paste between VMs, and two do not. Some environments offer crash isolation: If a program hangs up in one partition, you can simply do a warm boot to restart it while processing continues undisturbed in the other partitions; others do not provide this important feature.

Something else to consider. Your favorite applications may not run in some environments. Although it was not possible to perform an exhaustive compatibility test, I tried out *WordStar 4.0*, *Microsoft Word*, *Word For Word*, *Lotus Express*, *PC-Talk*, *ProComm Plus*, *SideKick*, *ProKey 4.0*, QuickBASIC 4.0, and a shareware key-repeat-rate utility called *Kbfix2*. A few problems surfaced in the course of this informal test.

Regardless of which 80386 environment you choose, multitasking takes some getting used to. A couple of these environments make the transition so difficult that it may not be worth the trouble, but the two that work well are not only efficient work boosters, they're big fun too.

Windows/386 2.1

Microsoft Windows and *Windows/386* are widely used operating environments. In fact, many popular applications (like Aldus's *PageMaker* and Owl's *Guide 2.0*) can be run on a PC only under *Windows*.

DAVID SUTER

Like version 2.03 (see "Still Waiting For Windows/386," *PCW*, April 1988), *Windows/386 2.1* ($195) sports a Macintosh-like user interface with pulldown menus and dialog boxes that clearly inspired OS/2's Presentation Manager. Also like OS/2, the system implements *virtual memory:* It automatically swaps program code from memory to disk when you run out of RAM. It swaps only *Windows* itself, or *Windows*-specific programs like *PageMaker*, however. New features include access to an additional 60K of conventional memory, a built-in control for key repeat rate, improved setup, and support for 74 additional printers and plotters.

Thanks to clear documentation and a menu-driven setup utility, the system is extremely easy to install. Applications written specifically to work with *Windows* can be run simply by clicking the mouse on them. However, before you run a non-*Windows*-specific application for the first time, you must create a PIF file to tell *Windows* how much memory the application requires, whether it writes directly to the screen,

EXECUTIVE SUMMARY

Windows/386 2.1

Operating environment

A seamless Mac-like interface, virtually indistinguishable from OS/2's Presentation Manager, makes this popular environment very easy to use, and it includes a package of handy software. But slow performance and awkward serial-port switching introduce unnecessary frustration.

	POOR	FAIR	GOOD	EXCELLENT
Application management				●
Installation and configuration			●	
Memory management				●
Overall value			●	

whether it will run in the background, whether it will allow *other* programs to run in the background, and so on. While the built-in PIF editor simplifies the process of filling in the blanks, figuring out what to put in the blanks is no trivial process. In many cases, only trial and error will reveal how much memory a given application needs; until you get it right, you'll face a barrage of error messages and program crashes.

Applications start from *Windows*' master control program, MS-DOS Executive. Each program runs in its own window, or partition, which can be as large as 640K. Windows can be resized and moved around the screen easily with the mouse. It was only possible to install three 640K partitions on a 4MB Compaq Deskpro/386 before *Windows* began swapping code to disk; this was the smallest number of VMs in the roundup.

Usability is uneven. Switching between partitions can be tricky at first, but once you learn the ropes it's relatively easy to step through program partitions by pressing <Alt>-<Tab> or <Alt>-<Esc>. *Windows/386* lets you cut and paste text and graphics from one partition to another with a well-designed clipboard function. True crash isolation is not provided; however, if a program crashes in one partition, a "terminate" option usually permits you to extricate yourself and save the files in the other VMs before restarting the system.

Swapping the serial port is tedious. Once the port is assigned, if you try to use it in another VM, a dialog box appears and demands to know which partition should get the port; unassigning it can be cumbersome. There were no compatibility problems.

Windows/386 delivers only mixed performance. Even with no disk swapping to slow execution, single-tasking was still next-to-worst in the roundup. However, in multitasking mode *Windows/386* came in second.

Windows/386's wide popularity is well deserved, thanks to its first-class user interface, well-implemented cut-and-paste function, extensive compatibility, and a software package that includes a bare-bones word processor, a competent paint program, and a gang of handy utilities. But for everyday business users, its tedious COM-port switching and relatively slow single-tasking are serious drawbacks.

Desqview 2.01

Quarterdeck's *Desqview* is a polished multitasking operating environment with an outstanding user interface; when run with the company's QEMM-386 memory manager, it's a seamless 386 multitasker. *Desqview* delivered the fastest performance, in both events, of any environment in the roundup. Like *Windows/386* and OS/2, it offers virtual memory—and even betters *Windows*, which swaps only *Windows*-specific applications, by swapping all programs.

A menu-driven utility makes installation of *Desqview* ($190, including QEMM-386) a snap. However, before you can run DOS programs, *Desqview* requires you to create a PIF file for each one, a process that's even more complicated here than it is with *Windows*. Excellent documentation helps, but not enough. Once applications are installed, their names appear on a *Desqview* start-up menu.

The largest partition allowed was 525K, and I managed to fit six of these partitions in the 4MB Compaq—the highest number in the roundup.

Desqview provides an extremely well-designed, easy-to-use interface. A tap on the

FEATURES EVALUATION

Multitasking 80386 Operating Systems

Desqview and Windows/386 lead the pack in application management. Desqview takes first place for installation and configuration, as well as for memory management.

● Yes
○ No
◒ Deficient

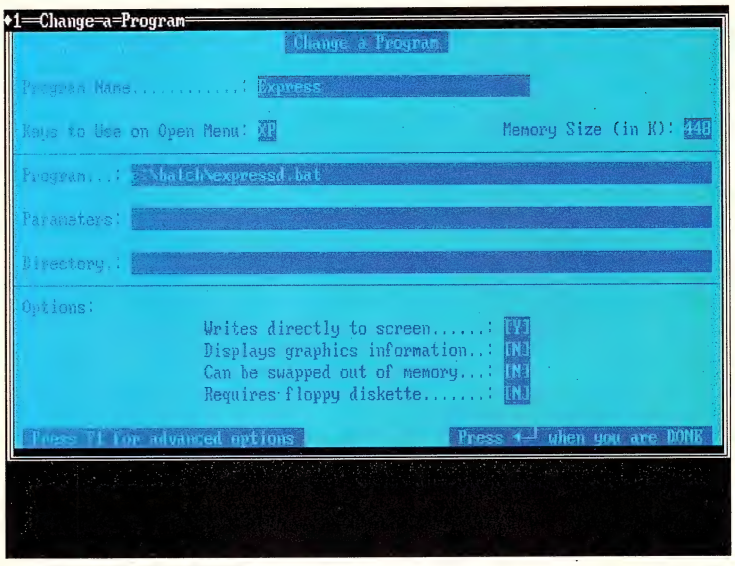
Application management	Windows/386 2.1	Desqview 2.01	VM/386 1.1	PC-MOS/386 2.10
Runs two or more programs in a virtual machine	●	●	●	●
Runs EGA applications	●	●	●	●
Specifies processor time per application	○	●	●	●
Swaps serial port automatically	○	●	○	●
Switches virtual machine easily	●	●	●	●
DOS operations from menu	●	●	○	○
Compatible with most major DOS applications	●	●	○	○
Tasking				
exclusive	●	●	●	●
background	●	●	●	●
background suspend	●	●	●	●
Crash isolation	◒[1]	●	●	○
Overlapped windows	●	●	○	○
Tiled windows	●	●	○	○
Cut and paste				
text	●	●	○	○
graphics	◒[2]	○	○	○
Tools				
auto-dialer	●	●	○	○
calculator	●	◒[3]	○	○
calendar	●	◒[3]	○	○
card file	●	○	○	○
clipboard	●	●	○	○
clock	●	○	○	○
command-line editor	○	○	○	●
communications program	●	◒[3]	○	○

Application management	Windows/386 2.1	Desqview 2.01	VM/386 1.1	PC-MOS/386 2.10
disk cache	●	○	●	●
key-repeat speedup	●	○	○	○
macro processor	○	●	○	○
notepad	●	◒[3]	○	○
paint program	●	○	○	○
print spooler	●	○	○	●
RAM disk	○	○	●	●
word processor	●	○	○	○
Installation and configuration				
Disk space required	1.7MB	303K	661K	700K
Minimum RAM required	1MB	256K	2MB	1MB
Coprocessor support				
8087	○	●	○	●
80287	●	●	●	●
80387	●	●	◒[4]	●
Menu-driven installation	●	●	●	○
Clear documentation	●	●	●	○
Requires PIF files	●	●	○	○
On-line help	○	●	●	○
Memory management				
Virtual memory system	◒[5]	●	○	○
Expanded memory support	●	●	●	●
EMS 4.0 support	●	●	○	○
Maximum virtual machine size	640K	525K	640K	580K
Sizes virtual machines	●	●	●	●

[1] Terminate function allows you to exit crashed VM and save files in other VMs before restarting computer.
[2] Between Windows applications or from some standard applications into Windows applications.
[3] Available as part of Desqview Companions, which costs $100.
[4] May not work reliably when used with early 80386 chips.
[5] Swaps only Windows itself and Windows-specific applications.

<Alt> key brings up the *Desqview* menu, from which you can start a new application in a new VM, switch VMs, close down a VM, and resize or move a window. You can choose menu options with a mouse (by pointing and clicking) or cursor keys. Experienced users will appreciate the ability to switch rapidly between windows simply by typing a number from the Switcher menu.

A number of other well-designed features give *Desqview* a high usability rating. The program provides complete crash isolation and switches the serial port automatically when you change partitions. Although *Desqview* is known for some compatibility problems, none of the software tested had any



Desqview's complex Change a Program menu helps create program information files to optimize application performance.

trouble running. It lets you cut and paste text (but not graphics) between partitions.

Desqview seems designed to save time, instead of eating it up with serial port conflicts and slow performance. It may take you a while to master its configuration routine, but its speed and easy-to-use interface will win you over.

VM/386 1.1

Intelligent Graphics' *VM/386* is simple to install and simpler to run. Best of all, it requires no PIF files. Unfortunately, it is also the slowest performer in the roundup in both tests, and (at $245) the most expensive. Software conflicts and nonresizable, full-screen windows are additional shortcomings.

Easy-to-use installation software makes initial setup of *VM/386* a breeze. Once it's up and running, you use the Machine Control menu to install VMs as large as 640K in various combinations and sizes. Each VM can have its own CONFIG.SYS and AUTOEXEC.BAT; default versions of these files are provided if you don't want to customize them. Each VM comes up as an empty, full-screen window with a DOS command line, ready to run applications. Windows cannot be resized.

Once you've installed your VMs, you can save the setup; thereafter, when you boot *VM/386* it will start the VMs automatically. This process does not always work flawlessly, however; on several occasions, when *VM/386* was trying to start several VMs at the same time, one or more failed and needed to be restarted.

The program itself gobbles a humongous 2MB of RAM, and due to a conflict with Compaq's memory management scheme, some of the RAM in the test PC was inaccessible. As a result, only four 640K VMs could be installed on a 4MB Compaq.

Usability is uneven. On the bright side, no PIF files are needed. Switching between VMs couldn't be easier: You can press <Alt>-<Sys Req> to bring up the Switcher menu, cursor down to the name of the desired machine, and press <Enter>; or simply press <Alt>-<Sys Req> *number* for a faster switch. *VM/386* provides complete crash isolation; you can reboot a virtual machine without restarting the entire system.

On the downside, no cut and paste is available. Reassigning the serial and parallel ports is a tedious process, requiring you to use the Hardware Control menu every time. More distressing, compatibility was spotty. *ProComm Plus* ran fine; *PC-Talk* wouldn't load at all; *Express* loaded, logged on to MCI, and uploaded messages nicely, but then it refused to download and trashed program and data files on the hard disk. (Intelligent

EXECUTIVE SUMMARY

Desqview 2.01

Operating environment

BEST BUY

Excellent performance, a convenient user interface, virtual memory, full crash isolation, automatic serial-port switching, and reliable operation make this trouble-free multitasker a clear winner. Cut and paste works for text but not graphics.

	POOR	FAIR	GOOD	EXCELLENT
Application management				●
Installation and configuration				●
Memory management			●	
Overall value				●

Graphics claims that *VM-386*'s problems with *Express* have been solved in the forthcoming version 1.12.)

VM/386 costs a bit more than the other environments, but its ease of use is tempting, especially for users who don't have time to figure out PIF files for every DOS application. Documentation is decent, and the user interface is attractive. But *VM-386*'s relative slowness is frustrating, and its destruction of *Express* disk files is disturbing to say the least. Wait until they fix the bugs before you buy.

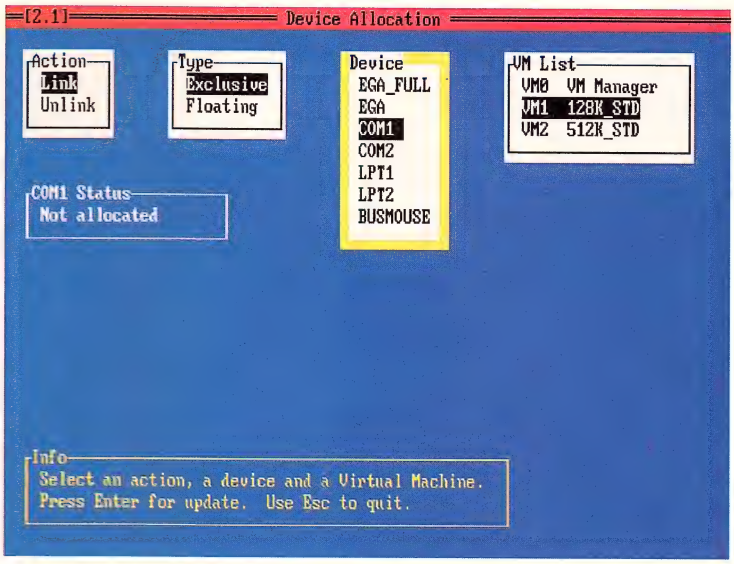
PC-MOS/386 2.10

PC-MOS/386 from The Software Link is the odd-environment-out in this roundup; unlike the other three, which work with DOS, PC-MOS/386 replaces it completely. It's designed as a multiuser operating environment, but it works as a single-user multitasking system as well. Once you get it running it performs decently enough, but installation and configuration are difficult, and it won't run some popular applications like *ProKey* and *SuperKey*.

PC-MOS/386 ($195) comes with a hard disk installation utility that leaves a number of critical tasks for the user. Most people will find it tough to get started. Many important features, like the print spooler and the disk cache, won't work until you specify memory addresses and segment sizes—and the documentation is technical and hard to understand. I could not get the operating system up without hand-holding from tech support—and I decided to leave some handy features (like that print spooler) uninstalled. One nice touch: No PIF files are needed.

The process of installing VMs is a bit clunky, but you can automate the entire procedure with an easily edited AUTOEXEC-.BAT file. A system-level command, .ADD-TASK, creates VMs and assigns memory to them. Each partition can have its own AUTOEXEC.BAT file, but not a CONFIG.SYS file. The largest VM I was able to install on my 4MB Compaq was 580K, but five such VMs went in without any out-of-memory messages. VMs come up as full-screen (non-resizable) windows, and you run programs from a command line prompt, as in DOS.

PC-MOS's usability is unimpressive. While switching between partitions is easy (all you do is press <Alt>-*number*), you cannot cut and paste between partitions; nor is crash isolation provided. PC-MOS handles serial port arbitration automatically, but it is far from trouble free. An XMODEM transmission under *ProComm* ran fine in the background, but when another application tried to access the serial port, *ProComm*'s XMODEM routine crashed and could not recover.



VM/386's Device Allocation menu is used to swap access to COM and LPT ports from one virtual machine to another.

EXECUTIVE SUMMARY

VM/386 1.1

Operating environment

Easy to install and operate, this environment boasts an attractive, menu-driven interface and allows you to run DOS applications without tedious PIF files. Unfortunately, it's a slow performer, requires manual serial port reassignment, and destroys *Lotus Express* disk files.

	POOR	FAIR	GOOD	EXCELLENT
Application management			●	
Installation and configuration				●
Memory management				●
Overall value			●	

A review of PC-MOS version 1.01 (see *The Software Shelf, PCW,* December 1987) complained about limited compatibility with DOS applications. The Software Link claims that version 2.10 will run most popular applications, including *dBASE III Plus*, *1-2-3*, and *R:base*. However, macro processors like *ProKey* and *SuperKey* still won't run, *SideKick* requires special patching, and *Express* refused to load at all.

Performance was mixed. In single-tasking mode, PC-MOS/386 had the second-fastest score in the roundup; however, in multitasking mode it came in next to last.

PC-MOS/386 is an interesting environment, but it seems best suited for people who aren't daunted by having to manipulate memory segments. Its inability to run applications like *ProKey* and *Express* and its hazardous COM port arbitration support make it a poor choice for business users.

80386 System Winners

There is no question which environment is the most useful for today's business user. *Desqview*, which has been around long enough to have worked all the bugs out of its system, is fast, powerful, easy to use, and trouble free. *Windows/386* is deservedly popular and features a highly polished user interface, but it's a bit slow, and swapping the serial port from partition to partition grows tedious. *VM/386* runs DOS applications without PIF files, and it will be a serious contender once it speeds up, simplifies its serial port switching, and solves its compatibility problems. PC-MOS/386 is simply too difficult to install and use.

If you're tired of waiting for OS/2 and want to start increasing your productivity today, there's no reason to delay any longer. You *can* do two things at the same time—even more—as long as you choose the right operating environment.

Michael Goodwin is an associate editor for PC World.

EXECUTIVE SUMMARY

PC-MOS/386 2.10

Operating environment

Seemingly designed more for the technically oriented user than the business user, this command-line–driven environment is highly flexible and can be started from an easily edited batch file. But it's difficult to install and won't run some popular applications.

	POOR	FAIR	GOOD	EXCELLENT
Application management			●	
Installation and configuration			●	
Memory management			●	
Overall value			●	

WHERE TO BUY

Desqview 2.01
Quarterdeck Office Systems
150 Pico Blvd.
Santa Monica, CA 90405
213/392-9701
Price: $190 (includes QEMM-386)
Accessories: Desqview Companions $100
Requirements: 256K (640K and expanded memory recommended), DOS 2.00 or later version
Technical support: no toll-free number, M–F 9–5, 24-hour fax number
Other support services: 12-month Priority Service $30, forums on CompuServe and BIX
For more information, circle 630 on reader service card.

PC-MOS/386 2.10
The Software Link
3577 Parkway Ln.
Atlanta, GA 30092
404/448-5465
Price: single-user version $195
Requirements: 1MB (2MB recommended)
Technical support: no toll-free number, M–F 8:30–6:15
Other support services: 24-hour bulletin board (no toll-free number)
For more information, circle 631 on reader service card.

VM/386 1.1
Intelligent Graphics Corp.
4800 Great America Pkwy.
Santa Clara, CA 95054-1221
408/986-8373
Price: single-user version $245
Requirements: 2MB, DOS 3.00 or later version
Technical support: toll-free number, M–F 8–5
Other support services: none
For more information, circle 632 on reader service card.

Windows/386 2.1
Microsoft Corp.
16011 N.E. 36th Way
Box 97017
Redmond, WA 98073-9717
206/882-8080
Price: $195
Requirements: 1MB (2MB recommended), DOS 3.10 or later version
Technical support: no toll-free number, M–F 7–4
Other support services: none
For more information, circle 633 on reader service card.

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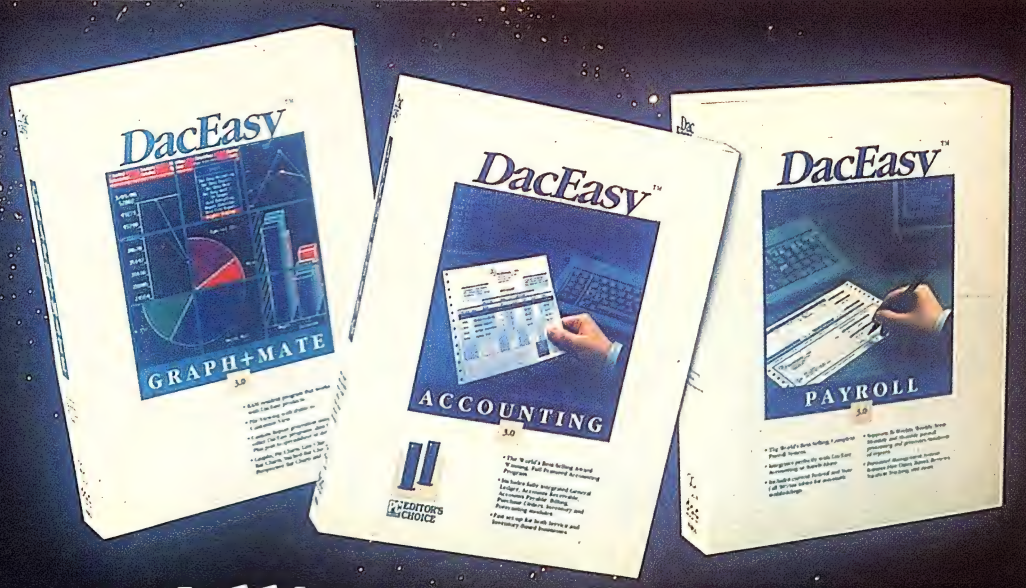

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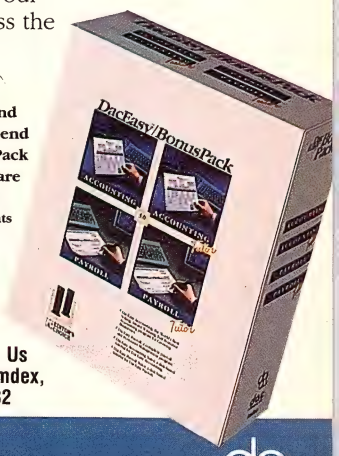

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Standard Features:

- 80286 microprocessor running at 20 MHz.
- 1 MB of RAM (640K usable) expandable to 16 MB (8 MB* on system board).
- Page mode interleaved memory.
- Integrated diskette and VGA video controller on system board.
- One 3.5" 1.44 MB diskette drive.
- Integrated high performance hard disk interface on system board.
- Enhanced 101-key keyboard.
- 1 parallel and 2 serial ports.
- LIM 4.0 support for memory over 1 MB.
- Three full-sized AT† compatible expansion slots available.
- Socket for 80287 coprocessor.

Options:

- External 5.25" 1.2 MB diskette drive.
- 3.5" 1.44 MB diskette drive.
- Intel 80287 coprocessor.
- 1 MB RAM upgrade kit.

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System 220	With Monitor		
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A great value in a full-featured AT compatible. An 80286 computer running at 12.5 MHz, this computer is completely MS-DOS and MS OS/2 compatible. The System 200 offers high speed drive options, industry standard compatible BIOS and on-site service. As Executive Computing said of this computer's predecessor, "If faster processing speed and low cost are two key issues affecting your purchase decision, this machine might be the ideal choice for your office."

Standard Features:

- Intel 80286 microprocessor running at 12.5 MHz.
- 640 KB of RAM expandable to 16 MB (4.6 MB* on system board).
- 5.25" 1.2 MB or 3.5" 1.44 MB diskette drive.
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- Enhanced 101-key keyboard.
- 1 parallel and 2 serial ports.
- 200 watt power supply.
- Real-time clock.
- 6 expansion slots. (4 available with hard disk drive controller and video adaptor installed).
- Socket for 8 MHz 80287 coprocessor.

Options:

- 512 KB RAM upgrade kit.
- 8 MHz Intel 80287 coprocessor.

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Circle 74 on reader service card

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162 **Micro 1 Tower 386-20MHz**
A true bargain among machines of its class, the Micro 1 blends solid construction and design with an extraordinarily low price.

164 **SnapShot**
Capture and edit images from any video source—including a TV—with the first fully realized image processing system for the PC.

172 **HP PaintJet**
Crisp, vivid color graphics; speedy text printing; and a reasonable price distinguish this briefcase-size ink jet printer.

176 **Zoom HC 2400**
If you need Hayes functionality but don't want to shell out for the real thing, consider a compatible modem-on-a-board that works even in the fastest computers.

184 **Panasonic KX-P4450 Laser Partner**
Basic business printing is the Panasonic's forte. It beats the price and the text-printing speed of the LaserJet Plus but falls down on graphics.

Micro 1 Tower 386-20MHz

80386 system

BEST BUY

PROS: Tower design, inexpensive, quiet

CONS: No disk-caching software, no 32-bit slots

Despite rocketing RAM costs, system prices keep coming down. Micro 1 has the latest steal, a 20-MHz 80386 at half the price of a Compaq Deskpro 386/20, $1500 less than Dell's System 310, and even $100 less than a comparable Blackship. Although the Micro 1 lacks 32-bit expansion slots and runs disk-intensive applications rather slowly due to its lack of disk-caching software, it is a solid, usable 20-MHz 80386 at one of the lowest prices ever.

The Micro 1 Tower's $3335 base price includes 1MB of 32-bit motherboard RAM; a 28ms, 45MB Toshiba hard disk; a 1.2MB floppy drive; one serial and one parallel port; a 101-key Key Tronic keyboard; and a monochrome graphics monitor and adapter. ($5025 will buy you the system we reviewed: 2MB of motherboard RAM; a 28ms, 110MB MiniScribe hard drive; a VGA adapter; a color analog monitor; and an 80387 math coprocessor.)

The Micro 1's only serious flaw is its lack of disk-caching software. As a result, in National Software Testing Laboratories (NSTL) tests not shown here, the machine ran disk-intensive applications like *dBASE III Plus* four times slower than did the Compaq 386/20—despite a fast, 28ms hard drive. In fact, it ran slower than many 16-MHz systems on these tests. When third-party disk-caching software was used, as in the NSTL tests shown, the Micro 1 pulled right up with the Compaq. At least compatibility isn't an issue—the Micro 1 aced the NSTL Crash Test.

The Micro 1's 20-MHz CPU (downshiftable to 6 MHz) alternates between zero and one wait state using an interleaved memory scheme that relies on a 64K cache of high-speed static RAM to intercede between the

CPU and the 100ns dynamic system RAM. You can upgrade system RAM in 1MB increments to a respectable 10MB of 32-bit memory, all socketed on a Mylex motherboard and all accessible at 20 MHz.

Expandability is average. The 8-MHz, one-wait-state expansion bus provides two 8-bit and six 8/16-bit slots. An Adaptec hard/floppy controller that permits 1:1 interleaving (a big advantage for applications like CAD/CAM that load large data files) takes up one 8/16-bit slot. An I/O board and a display adapter take up both 8-bit slots. All six half-height drive bays are externally accessible.

The Micro 1's ergonomics are decent. The sturdy, vertical-standing cabinet is easy to open, and the 220-watt power supply is remarkably quiet. Controls and indicator lights (power and reset switches, a keylock, and a disk activity light) are conveniently located on the front panel; unfortunately, they are placed halfway down the tower, making them a bit hard to reach. No CPU-speed indicator light is included, but the cursor changes shape when you downshift to 6 MHz with a keyboard command.

Peripherals are first-rate. The 101-key Key Tronic keyboard had a sure, quiet touch, while the Amdek VGA color monitor that arrived with the system was crisp and bright from edge to edge.

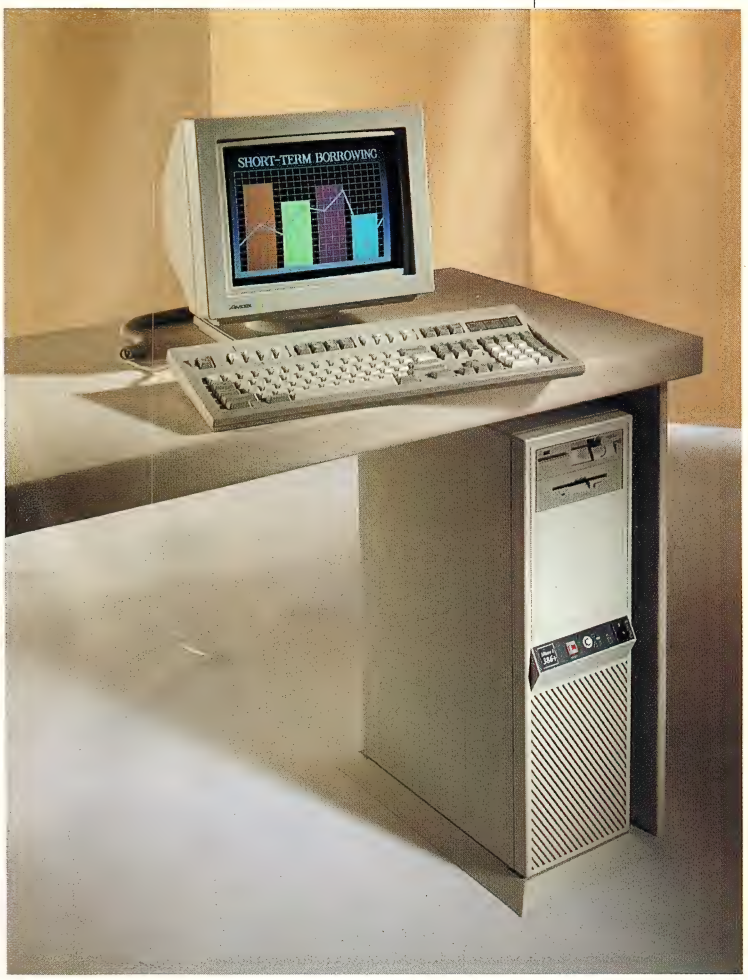
System extras are mostly impressive too. The Micro 1 comes with a ROM-based setup program and a package of utilities that includes an EMS 4.01 Expanded Memory Manager. The documentation was a bit sketchy, but Micro 1 promises a better set soon.

The Micro 1's price is so impressively low that if the system weren't such a drudge at *dBASE* it would be a total triumph. Even so, solid ergonomics, decent expandability, and a rock-bottom price make it a rare find. Users searching for top speed, bus-master capability, or 32-bit expansion slots should look elsewhere, but budget-minded users thinking about moving up to a 20-MHz 80386 will like what they see. —*Eric Brown*

WHERE TO BUY

Micro 1 Tower 386-20MHz
Micro 1
557 Howard St.
San Francisco, CA 94105
800/338-4061, 415/974-5439
List price: with 1MB RAM, 45MB Toshiba hard disk drive, 1.2MB floppy drive, Adaptec 2372 controller, monochrome graphics monitor and adapter, one parallel and one serial port, 101-key Key Tronic keyboard, assorted utilities $3335
Accessories: amber monochrome graphics monitor and adapter $135, color monitor with Everex EGA $534, color monitor with Paradise VGA Plus $734, NEC MultiSync II with Paradise VGA Pro $1150; 1MB RAM $425; 80387-20 coprocessor $735; 1.44MB 3½-inch floppy drive $139, 1.2MB 5¼-inch floppy drive $125, 360K 5¼-inch floppy drive $95; 45MB Toshiba hard drive $499, MiniScribe 110MB hard drive $774, 330MB

The Micro 1 Tower 386-20MHz is a fast, fully functional 80386-based computer at a rock-bottom price.



JOHN GREENLEIGH

FEATURES EVALUATION

Micro 1 Measures Up

The Micro 1 Tower 386-20MHz lacks forward-looking extras such as 32-bit slots or a multi-mastering bus, but for the features that count today, it stands up well to systems that cost more than twice as much.

● Yes
○ No

	Micro 1 Tower 386-20MHz	IBM PS/2 Model 80-111
Standard features		
Price[1]	$4424	$10,995
CPU	80386	80386
Clock speed	20 MHz	20 MHz
Built into motherboard		
Parallel port	○	●
Serial port	○	●
Floppy disk controller	○	●
Video adapter	○	●
Coprocessor support	80387	80387
32-bit memory bus capacity		
Amount shipped with basic unit	1MB	2MB
Maximum installable	10MB	4MB
Expandability		
32-bit expansion slots/number free	0	2/2
8/16-bit expansion slots/number free	6/5	5/4[2]
8-bit expansion slots/number free	2/0	0
Half-/full-height storage device bays	6/0	2/2[3]
120MB or larger hard disk available from manufacturer	●	●
Ergonomic design		
Front-panel reset button	●	○
Front-panel on/off switch	●	●
Front-panel keyboard socket	○	○
ROM-based setup software	●	○
Tilt-and-swivel monitor	●	●
Compact footprint	●[4]	●[4]
Complete documentation	●	●

[1] Price based on 2MB RAM, one floppy drive, one 110MB (Micro 1) or 115MB (IBM) hard disk and controller, VGA (monitor not included), one parallel port, one serial port, and a 101-key keyboard.
[2] Slots accept only MCA-compatible boards.
[3] Half-height bays accept only 3½-inch devices.
[4] Floor-standing model.

Toshiba SCSI hard drive $2195; 60MB Irwin internal tape backup $665; serial port $45; parallel port $30; MS-DOS 3.30 and GW BASIC 3.3 $89
Warranty: one year parts and labor, 30-day money-back guarantee
Extended warranty: 10 percent of original cost each year
Technical support: no toll-free number, M–Sat 8–5
Other support services: none
For more information, circle 601 on reader service card.

SnapShot

Image processing system

PROS: Easy to use, digitizes live images

CONS: Cannot produce ASCII file from scanned text, generates only TIF and EPS graphic files

If you are thinking of spending $1700 to $4000 for a scanner that digitizes flat artwork and photographs for desktop publishing, think again. Aldus's *SnapShot* system ($2300 to $2900) captures and freezes pictures from any video source—a video camera, VCR, videodisk, or even a live TV broadcast—to create a digital image of virtually anything: flat, round, or moving.

SnapShot is the first full-featured PC product of its kind. Not only does its output compare favorably with that of similarly priced scanners, but the TIF and EPS files it generates are significantly smaller than comparable files from a scanner.

The heart of the system is Aldus's *Windows*-based *SnapShot* software ($495). You'll also need to spend between $700 and $1500 for an image processing board (or "frame grabber") like those sold by Matrox or Imaging Technology, and buy an analog monitor (in addition to your system monitor) and an image source—probably a video camera. You can buy the elements separately or as a package from Micro D (with a relatively expensive Ikegami camera) for around $2900.

Using *SnapShot* is a three-step process: capture an image, freeze and edit it, and save it to disk. To get started, all you do is connect the video source and analog monitor to the frame-grabber board, load *Microsoft Windows* (a run-time version is included), and run *SnapShot*.

Displaying a captured image takes two mouse clicks; nothing happens on the regular

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Multispeed Hd	2329
Toshiba T-1000	785
T-1200F	1565
T-3120	3068
T-3200	3785
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Zenith	
Supersport/2	1655
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Supersport 286/Model 20	3445

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Monograph System	1299
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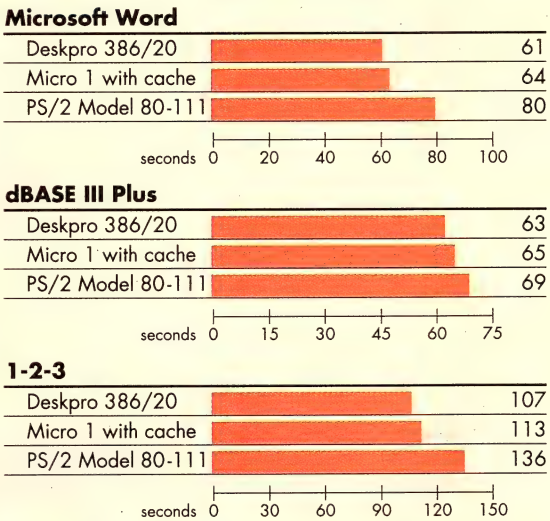
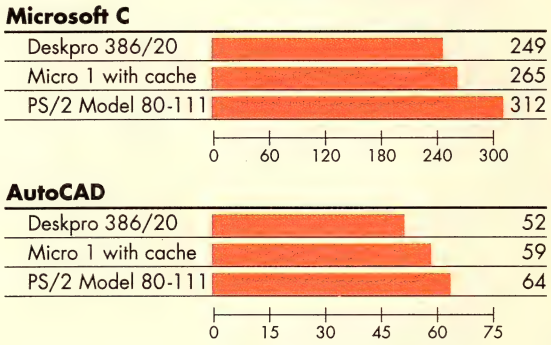
Circle 178 on reader service card

NSTL TEST REPORT

Micro 1 Tower 386-20MHz

The Micro 1 hangs in there with the 20-MHz pack on most tests when a third-party disk cache, is used.





The Micro 1 was tested with a 110MB hard disk, 2MB of RAM, and a 64K memory cache. Super PC-Kwik was used to provide a disk cache of 256K of extended memory. The IBM PS/2 Model 80-111 was tested with a 115MB hard disk, 4MB of RAM, and a disk cache of 256K in extended memory. The Compaq Deskpro 386/20 was tested with a 135MB hard disk, 4MB of RAM, a 32K memory cache, and a disk cache of 256K in extended memory.

Microsoft Word 4.0
A *Microsoft Word* macro loads a 35-page, 140-paragraph document and performs search-and-replace and spell-checking operations. The first page of the document is then printed. Although the results of the benchmark depend primarily on processor and memory access speeds, display adapter and hard disk speeds are also contributing factors.

dBASE III Plus 1.1
The *dBASE III Plus* test measures the time required to prepare and print a report of past-due invoices. The report includes calculated fields and is based on three files: a 500-record customer file, a 1000-record invoice file, and a 2000-record item file. When disk caching is not used, the random access speed of the hard disk is, after processor speed, the most significant factor in this benchmark. With disk caching, sequential read performance becomes more important than random access.

1-2-3 2.01
In this benchmark, a *1-2-3* macro executes a series of recalculations using five different formulas within a *75-by-75*-cell matrix. Because there are few screen updates and no screen access is required, the results depend almost entirely on processing and memory access speeds.

Microsoft C 5.0
The Microsoft C benchmark measures the time required to compile and link XLISP, a public-domain program composed of 25 C source code files. The most important factors in this benchmark are processor and memory access speeds. The performance of the hard disk is also a factor; generally, disk caching has little effect.

AutoCAD 9
In this benchmark, a three-dimensional sample drawing is retrieved and displayed using AutoCAD's EGA driver. The zoom function is used to display the drawing from various perspectives; then the full drawing is printed. The results of the benchmark depend primarily on the speeds at which the processor and coprocessor operate and at which memory is accessed. The performance of the display adapter and the hard disk also have some effect.

Data based on tests designed and conducted by National Softwa ing Laboratories (NSTL). All rights reserved.

monitor, but the analog screen snaps to life with a live black-and-white image. The Auto-Gain option optimizes contrast and brightness automatically, or you can adjust the picture manually, just as you would on a TV. An impressive array of image controls can be accessed simply by popping open a menu and clicking.

Next you freeze and edit the image. *SnapShot* offers a number of handy options to sharpen and touch up image quality; filter color input; digitally remove unwanted elements; crop, enlarge, rotate, and combine images; create special effects such as solarization; and paint and blend pixels. For example, the blend option erases blemishes by combining values of neighboring pixels. Editing changes are displayed on the analog monitor.

Once you're satisfied, you can save the image as a TIF or EPS file, which can be used

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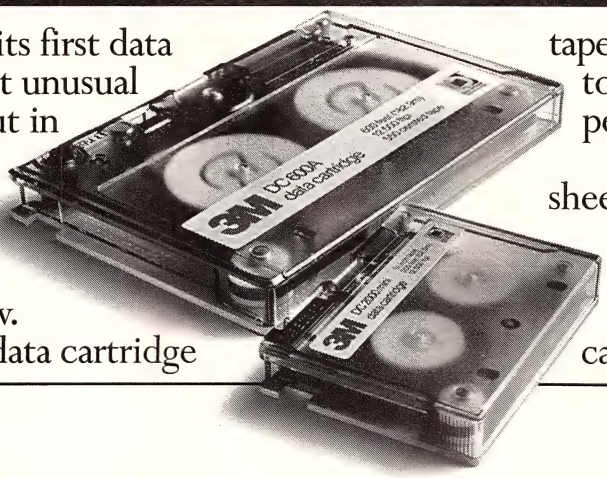
Circle 297 on reader service card

To create the world's first data cartridge tape, our engineers had to give up a lot of dreams.

To bring the world its first data cartridge tape, it wasn't unusual for our engineers to put in a little overtime on their overtime. Or occasionally miss the late show. Or even miss the late, late show.

And even after the data cartridge tape was born, they still refused to lay low. It had to be perfected.

So, instead of counting sheep, our engineers counted patents. In fact, over ten of them are in use today. A number no other data cartridge tape manufacturer



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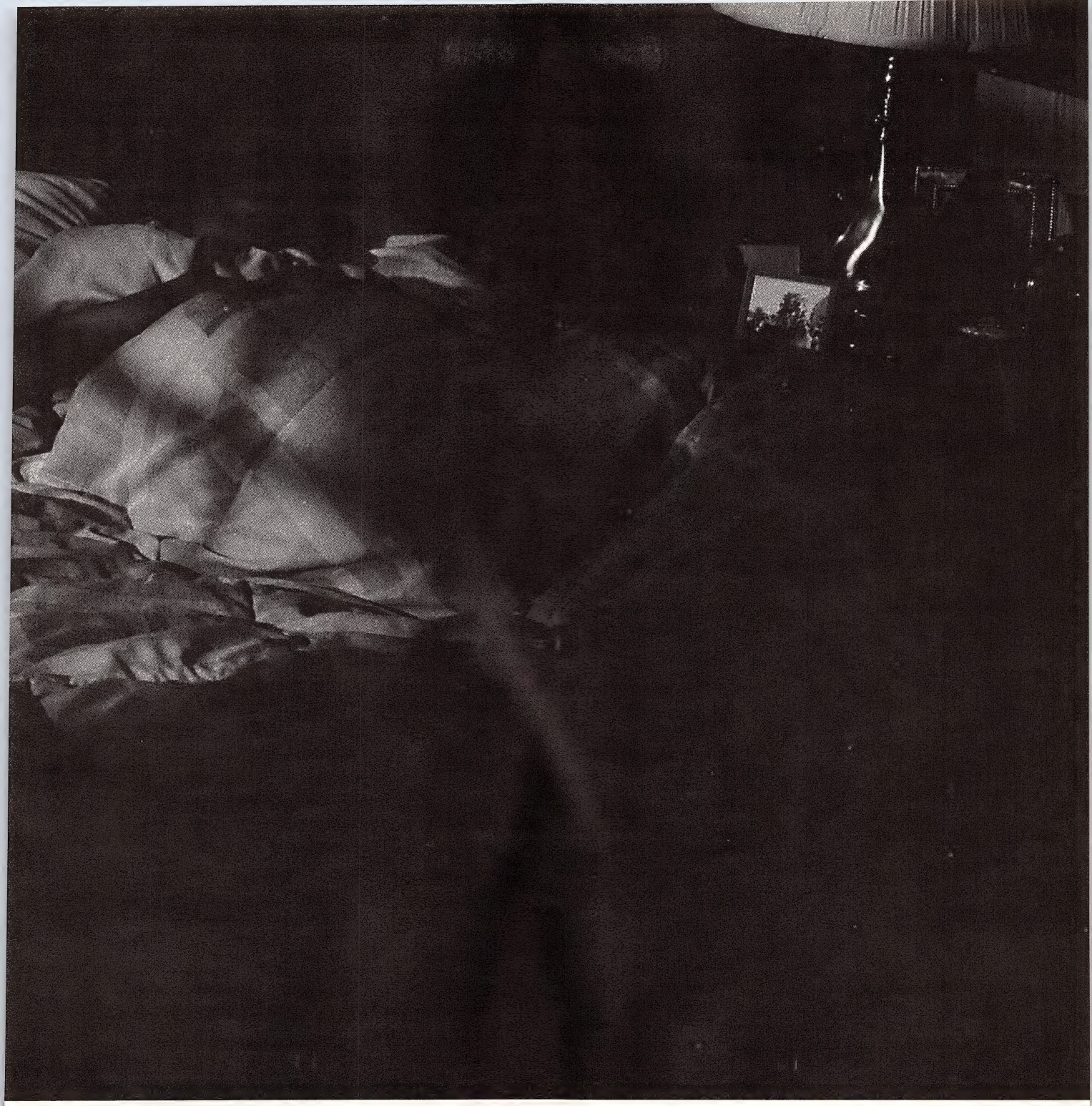

can even come close to matching.

During other sleepless nights, they'd toss and turn over technological breakthroughs like proprietary Blackwatch™ backcoating, No End Play (NEP) hub designs, Dura-Stat™ drive rollers and one piece tape guides for precision tracking.

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Circle 124 on reader service card

by compatible programs such as *WordPerfect 5.0*, *PageMaker*, *Ventura Publisher 2.0*, and *IBM Interleaf Publisher* and printed with PostScript devices such as IBM's Personal Pageprinter and Apple's LaserWriter. *SnapShot*'s default is an 8-bit gray-scale TIF; if your target program requires less data, you can use a lower resolution gray-scale format.

The *SnapShot* system is a pleasure to use. In fact, scanner manufacturers have reason to worry. The only drawbacks to *SnapShot* are that, unlike some scanners, it lacks OCR capability, and that it is more difficult to use for flat artwork and photos. Nonetheless, if you are a desktop publisher and need a jack-of-all-trades image digitizer, take a look at *SnapShot;* it may turn you into a video pioneer sooner than you think. —*Alan Southerton*

WHERE TO BUY

SnapShot
Aldus Corp.
411 First Ave. S
Seattle, WA 98104
206/622-5500
Micro D SnapShot System
Micro D
2801 S. Yale St.
Santa Ana, CA 92704
800/642-7631
List price: SnapShot software $495; Micro D system (software, Matrox PIP512B frame grabber, Sony 13-inch CPD-1310 Trinitron monitor, Ikegami ICD-200 video camera) $2905
Requirements: IBM PC AT or compatible, 512K RAM, 2MB free space on hard disk
Warranty: 90 days on SnapShot disk
Manufacturers' warranties: one year parts and labor for Matrox PIP512B; one year parts and 90 days labor for Trinitron CPD-1310, two years for cathode-ray tube; two years parts and labor for Ikegami ICD-200
Extended warranty: none for any part of the system
Technical support: 45 days only for SnapShot disk, no toll-free number, M–F 7–6
Manufacturers' support: free for lifetime of product for Matrox PIP512B, no toll-free number, M–F 9–5; free for lifetime of product for Trinitron monitor, toll-free number, M–F 9–5; free for lifetime of product for Ikegami ICD-200, no toll-free number, M–F 9–5
Extended support: one year support for SnapShot disk $100, toll-free number, CompuServe forum; no extended support for other parts of the system
Other support services: none
For more information on SnapShot, circle 602 on reader service card; for more information on Micro D system, circle 603.

HP PaintJet

Color ink jet printer

PROS: Sharp color graphics, good text printing speed, no smearing

CONS: Print features accessible only via software, no emulations

Colorized black-and-white movies may be déclassé, but a splash of color can add a touch of class to a boardroom-presentation transparency, a CAD/CAM printout, or an otherwise dreary *document noir.* One way to give your output Technicolor punch is with the $1395 Hewlett-Packard PaintJet, a moderately priced, 80-column, ink jet printer that produces sharp, vibrant color text and graphics. It's faster than Xerox's wide-carriage 4020 (see *The Hardware Shelf, PCW,* October 1988) and $100 cheaper.

HP's engineering acumen is evident in most aspects of the printer's design. The briefcase-size unit weighs in at only 11 pounds. Connections, DIP switches, panel controls, and ink cartridges are all easily accessible. The top-mounted control panel has membrane switches, plus LEDs that indicate paper-out and paper jams. Like the HP DeskJet (see *The Hardware Shelf, PCW,* June 1988), the PaintJet uses an innovative ink cartridge/printhead combination that elimi-

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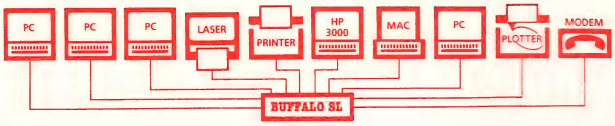

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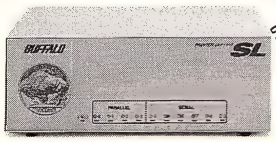

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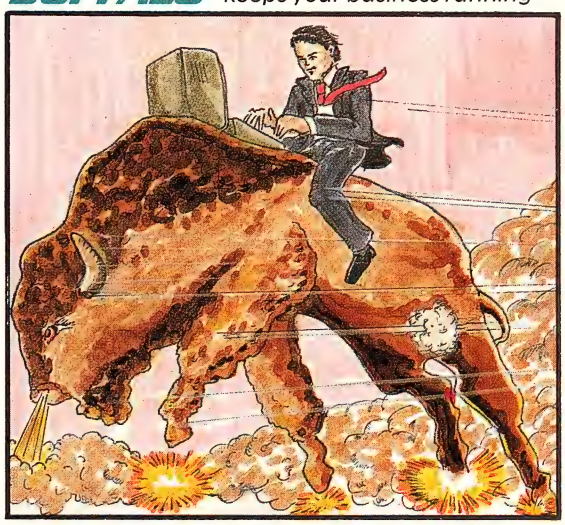

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Hewlett-Packard's PaintJet uses 60 nozzles and two ink cartridges to print crisp color text and graphics.

JOHN GREENLEIGH

nates messy refills. Unfortunately, the printer's paltry 8K buffer is not expandable.

Precision craftsmanship is also reflected in the PaintJet's gorgeous color output. The printer uses two ink cartridges and 60 nozzles to produce up to 330 distinct shades. It can generate graphics with a resolution of 180 dots per inch, and unlike with many ink jet units, its NLQ text quality approaches that of a good 24-pin dot matrix printer. However, it's no speed demon—at least not at graphics; the PaintJet takes a full 4 minutes to print a page of color graphics. Text mode is much quicker; a 250-word, double-spaced page churns out in 30 seconds.

The PaintJet packs three built-in fonts: 10-pitch Courier and 12- and 18-pitch Letter Gothic. It offers nine foreign-language character sets as well, plus boldface, underlining, and expanded and compressed text styles. On the downside, these features are accessible only via your applications or escape codes.

Unlike many ink jet printers, the PaintJet doesn't *require* special paper, but output quality does vary widely depending on the grade you use. HP recommends its own coated paper, which comes in cut sheets and fanfold. When you use this stock, the PaintJet's output is similar in quality to that of the Xerox 4020.

The PaintJet is obviously slower and produces lower resolution output than a high-end thermal-wax color printer like the $8000 Tektronix 4693D. While it's faster and cheaper than the Xerox 4020, it has a narrower carriage, and per-page costs are higher. Still, if you're looking for a printer that produces quality color graphics, and a low sticker price is your highest priority, give the PaintJet a look. —*Wes Nihei*

WHERE TO BUY

HP PaintJet
Hewlett-Packard
1820 Embarcadero Rd.
Palo Alto, CA 94303
800/752-0900
List price: with one parallel, serial, or HP-IB port $1395
Accessories: 8½-by-11-inch coated paper $23 (250 sheets), 9½-by-11-inch coated fanfold paper $18 (250 sheets), transparencies $65 (50 sheets); black ink cartridges $28 each, color ink cartridges $35 each
Warranty: one year parts and labor
Extended warranty: $96 per year for on-site service (within 4 hours of service center), $60 per year for next-day service, $36 per year for carry-in service
Technical support: toll-free number, M–F 8–5
Other support services: none
For more information, circle 604 on reader service card.

Zoom HC 2400

Internal 2400-bps modem

BEST BUY

PROS: Low price, works in high-speed buses, ProComm included free

CONS: Transmission errors over very noisy lines

The Zoom HC 2400 is a low-priced ($199), Hayes-compatible, internal 2400-bps modem designed to work in even the fastest computers. This half-length board includes a number of tempting features, such as a built-in speaker with an external volume control, a free copy of *ProComm*, and over $275 worth of discounts and on-line connect time. Considering that you can easily spend over $500 for a similar unit from Hayes, the Zoom HC is well worth a close look.

What's to say about an internal modem? You slide it into an 8-bit or 8/16-bit slot, put the cover back on your PC, and if it works, you forget about it. The Zoom HC 2400

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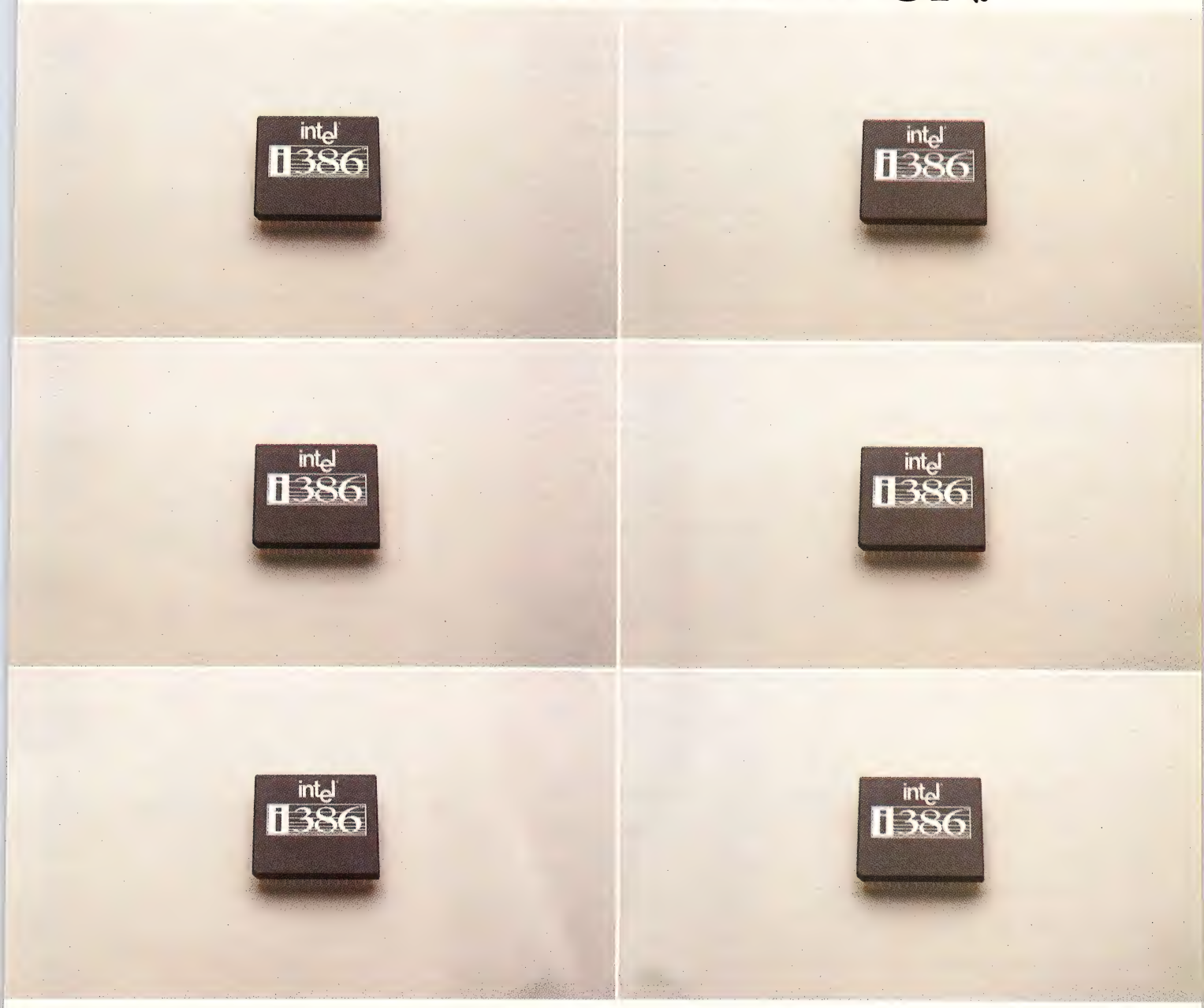

In the computer industry, every manufacturer wants to build their machines so fast, powerful, and easy to use that it gives them an edge on the competition. So at first, it seems surprising that these intense competitors all use the same chip: Intel's 386™ microprocessor.

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Advantage 2 512k *(for PS/2 Models 50/60)* . . call
Advantage 2-386 *(for PS/2 Model 80)*. . . . . call
RAMpage Plus 286 512k *(for XT/XT286/AT)* . call
RAMpage! Plus MicroChannel 512k *(for PS/2 Models 50/60)* . . . . . call
Amdek ... 90 days
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We are an authorized Epson Service Center.
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FX-1050 *(136 col., 264 cps, 9 pin)* . . . . . call
LQ-500 *(80 col., 180 cps, 24 pin)* . . . . . call
LQ-850 printer *(80 col., 264 cps, 24 pin)*. . . . call
LQ-1050 printer *(136 col., 264 cps, 24 pin)* . . call
LQ-2550 printer *(136 col., 400 cps, 24 pin)* . . call
LX-800 printer *(80 col., 180 cps, 9 pin)* . . . . . call
Printer-to-IBM cable (6 feet) . . . . . 15.
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NSTL TEST REPORT

Zoom HC 2400 Modem

Under noisy line conditions, the Zoom HC 2400 is more likely to develop errors while sending a file than the Hayes Smartmodem, but as this chart shows, in answer mode the Zoom matches or beats the Hayes.

Answer mode

Signal-to-white-noise ratio

Impairment level	7:1	8:1	9:1	10:1	11:1	12:1	13:1	14:1	15:1	16:1	17:1	18:1	19:1
Zoom HC 2400	—	100	100	100	98	85	59	21	9	3	0	0	0
Hayes Smartmodem	—	—	100	100	100	83	48	14	7	0	0	0	0

— = no connection

Phase jitter

Impairment level (in degrees)	43	42	41	40	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15
Zoom HC 2400	100	100	100	99	98	98	94	91	86	75	67	59	53	44	35	27	17	11	6	6	3	2	1	1	1	0	0	1	1
Hayes Smartmodem	100	99	99	100	98	98	96	94	95	82	77	59	60	49	35	29	18	18	10	5	0	0	0	0	0	0	0	0	0

Amplitude jitter

Impairment level (in percent)	44	43	42	41	40	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15
Zoom HC 2400	100	99	100	99	99	98	85	91	85	74	70	54	38	31	16	12	7	4	2	0	0	0	0	0	0	0	0	0	1	1
Hayes Smartmodem	100	100	100	100	99	100	96	95	86	83	72	59	53	38	24	20	9	4	5	0	0	0	0	0	0	0	0	0	0	0

errors: 91–100, 81–90, 71–80, 61–70, 51–60, 41–50, 31–40, 21–30, 11–20, 1–10

NSTL tested each modem's ability to accurately transmit data over noisy telephone lines using the TAS 1010 VoiceBand Channel Simulator. The system includes the Network Simulator, which mimics public and leased lines, and the Modem Test Unit, which automatically runs desired data back and forth between the test modem and a control Hayes Smartmodem 2400 and calculates resulting data transmission errors. In these tests, 10K simulated test files in 100-byte blocks were received by each examined modem and the block errors measured and reported. All tests were performed in answer mode. Starting values for the key impairments tested—white noise, phase jitter, and amplitude jitter—were based on AT&T Bell Labs' 1982–1983 *End Office Connection Study*. White-noise impairments ranged from 7:1 to 19:1. An impairment was lessened one step at a time to determine the point at which a modem could correct all the errors in a transmitted block. (In the Zoom HC 2400 white-noise test, for example, at the 13:1 signal-to-noise ratio, an average of 59 out of every 100 blocks received contained errors. The error rate dropped to 0 at 17:1.) Amplitude jitter tests were conducted in the same manner. The intensity of the impairment ranged from a maximum of 44 percent of amplitude jitter to 15 percent. Phase jitter intensities spanned 43 degrees to 15 degrees.

Note: The impairments encountered on average phone lines are much lower, and these modems should have no difficulty communicating under normal circumstances. The average signal-to-noise ratio is 34:1; amplitude jitter is 4 percent; and phase jitter, 8 degrees.

Data based on tests designed and conducted by National Software Testing Laboratories (NSTL). All rights reserved.

works. It responded quickly and reliably to all Hayes AT commands, going on and off line smoothly, dialing and downloading without incident.

Performance is fine under normal phone line conditions. When the line gets unusually noisy, the Zoom is more finicky sending files than the pricier Hayes 2400. In answer mode, however, as NSTL tests show, the Zoom matches or beats the Hayes.

Several nice design touches are built in. A speaker (often left off internal modems) keeps you informed of what the modem is doing—and thanks to the external volume control, there's no problem making the Zoom heard. A jumper lets you address the modem as COM3: or COM4: if your first two COM ports are tied up by printers or mice. And while some internal modems may not work in machines like the Packard-Bell, which boast bus speeds in excess of 8 MHz, the HC 2400 is designed to accommodate bus speeds of up to 12 MHz.

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Circle 254 on reader service card

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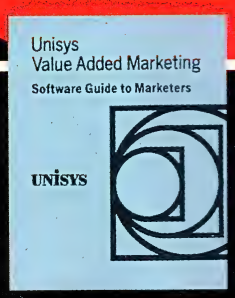

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plus a few unusual ones, such as the ability to set up a fully featured BBS.

Installation is a snap. There are no DIP switches, and unless you have to change the COM port setup, you won't need to move any jumpers. It took less than 20 minutes to get the modem installed and running, and it worked perfectly the first time out. Most of the installation manual is extremely clear, with plenty of pictures and a blessed absence of technical jargon.

So if you're in the market for a low-priced 2400-bps modem with free telecommunications software and on-line–service discounts, there *is* something to say about the Zoom HC 2400 internal modem: Buy it. —*Sam Hagerty-Hammond*

WHERE TO BUY

Zoom HC 2400
Zoom Telephonics
207 South St.
Boston, MA 02111
617/423-1072
List price: $199 (includes ProComm)
Accessories: none
Requirements: none
Warranty: two years limited, parts and labor; 90 days on defects in ProComm disk
Technical support: no toll-free number, M–F 9–5
Other support services: none
For more information, circle 605 on reader service card.

Panasonic KX-P4450 Laser Partner

Laser printer

PROS: Fast text printing, convenient front-panel controls

CONS: Limited software support, poor gray-scale graphics reproduction, a pain to install

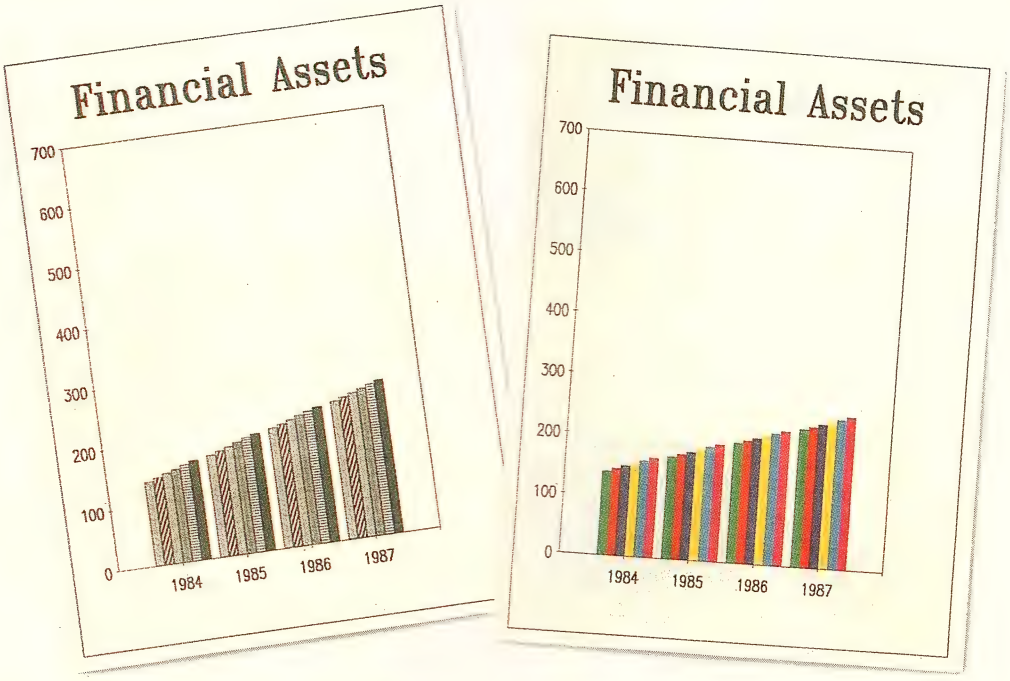
If you need a quick and convenient way to print business letters, Panasonic's KX-P4450 Laser Partner may be exactly what you're looking for. This $2595 LaserJet Plus clone comes with 512K RAM, costs $100 less than HP's LaserJet II, and prints text 3 pages per minute faster. On the downside, it's a bit slower at printing graphics, has problems reproducing grays, lacks broad software support, and is limited to a total 1.5MB RAM versus the LaserJet's 4.5MB.

The Panasonic KX-P4450 is built for a 5000-pages-per-month duty cycle (as opposed to the HP's 4000). Its front panel is easy to use, letting you choose among fonts and emulation modes and telling you exactly where paper is jammed. It comes with two easily loaded letter-size paper trays that hold a total of 500 sheets; the face-down output tray accommodates 250 pages, and output costs less than 3 cents per page.

The Laser Partner has 11 resident fonts—5 more than the LaserJet II—including several sizes of Courier and Courier Italic (none exceeding 12 point) and proportionally spaced Century and Century Italic. (Several optional font cards from Panasonic will be available soon.) However, unless you own *WordPerfect 5.0*, you won't be able to use more than one internal font. *WordPerfect 5.0* is the only package that supports the Laser Partner by name. With other software, you must fall back on the printer's LaserJet Plus, Epson, IBM Proprinter, or Diablo emulations. As with many LaserJet clones, the Laser Partner's LaserJet emulation does not extend to built-in fonts, so you're stuck with the default Courier typeface.

Fortunately, desktop publishers have another way to get at fonts. With the 1MB memory upgrade ($449) installed and LaserJet emulation, they can use downloadable fonts for the LaserJet Plus, including Bitstream's *Fontware* system for *PageMaker*, *Ventura*, *Microsoft Word*, and *WordPerfect*. However, like the LaserJet Plus it emulates, the Laser Partner limits all fonts to a maximum size of 30 points.

The Laser Partner does a splendid job of printing black-and-white line art, but graphics that depend on subtle variations of gray are a problem. A printout of a two-tone Corvette emerged in one tone only: muddy. Bars in a *Microsoft Chart* graph that were supposedly distinguished by their shades of gray proved indistinguishable. Panasonic claims the gray reproduction has been tweaked



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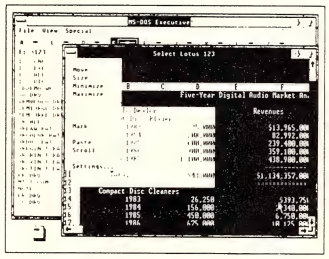

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UR MOTHER

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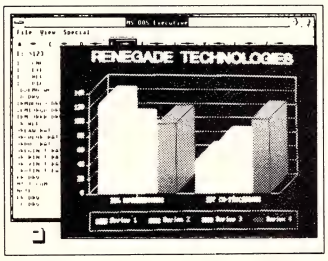

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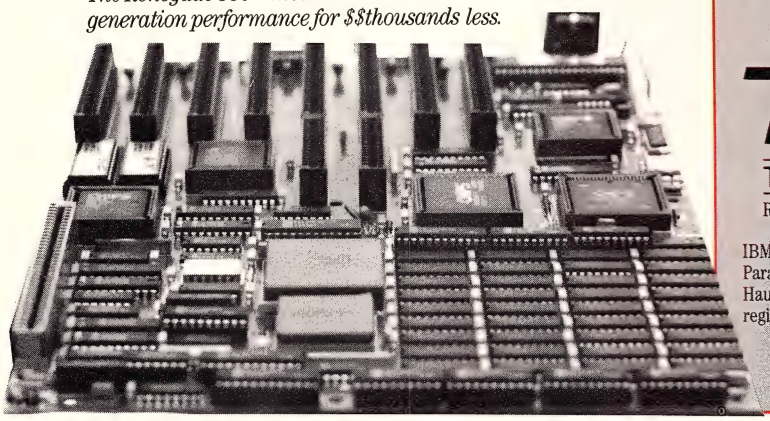

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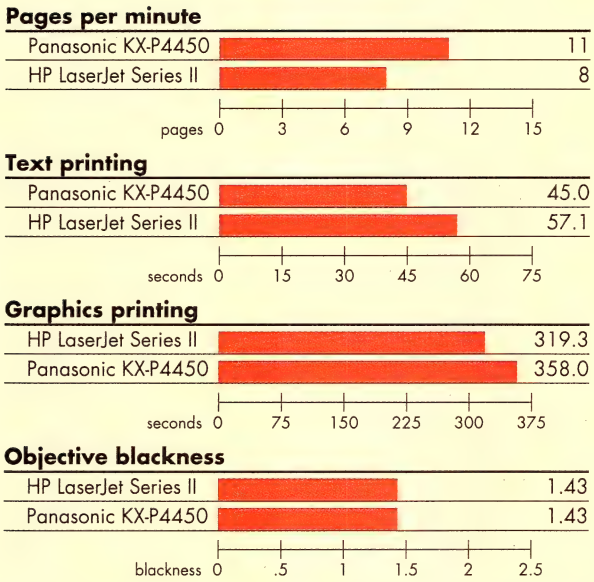
Circle 221 on reader service card

NSTL TEST REPORT

Panasonic KX-P4450

The Panasonic KX-P4450, a LaserJet Plus–compatible printer, leaves the HP far behind when printing text but fails to match the LaserJet's graphics performance.



An IBM PC AT with 640K of RAM was used to perform all tests. Both printers were configured with maximum allowable memory, and connected to the AT via the parallel port.

Pages per minute
This benchmark measured the number of pages each printer could produce in the second, third, and fourth minutes of printing. A 40-page document was sent to the printer, and at the end of the first minute the pages in the output tray were removed. Then the total number of pages produced in the following three minutes was divided by 3 to determine the average number of pages per minute.

Text printing
This benchmark measured the time it took to print a five-page text document, which was sent to the printer using XyQuest's *XyWrite III*.

Graphics printing
This benchmark measured the time it took to print a four-page document created using Xerox's *Ventura Publisher*. Each page was different, and each included a scanned photograph, raster graphics, and text.

Objective blackness
To perform this test, a large black rectangle was printed on a white background and a densitometer was used to gauge the relative blackness at each corner and the center of that rectangle. These measurements yielded five results that were then averaged. The higher the number, the blacker the rectangle. The possible range of scores was from 0, no light absorption, to 2.5, or 99.99 percent light absorption.

Data based on tests designed and conducted by National Software Testing Laboratories (NSTL). All rights reserved.

since our review unit was built, but more than a tweak will be needed.

Finally, the Laser Partner has a dirty secret: Its developer cartridge leaks if you're not *very* careful. In fact, the printer is a pain to install. Worse yet, while the documentation is decent, there's nothing in the manual about how to prepare the unit for shipping. All a technical support representative had to say on the subject was, "We don't recommend moving it much."

Panasonic's ads claim the Laser Partner is "ahead of its time." Actually, in some respects it's still back in the bad old days when letters were all an office printer needed to produce. The Laser Partner is an exemplary text performer, but its slow, muddy graphics output, limited font access, 1.5MB RAM limit, and awkward installation render it less attractive for a broader range of office tasks. —*Bill Taborchek*

WHERE TO BUY

Panasonic KX-P4450 Laser Partner
Panasonic Industrial Co.
Computer Products Division
Two Panasonic Way
Secaucus, NJ 07094
800/222-0584
List price: $2595
Accessories: 1MB memory upgrade $449; legal-size paper cassette $59, letter-size paper cassette $49, envelope cassette $85; toner kit $45; drum unit $190; developer unit $120
Warranty: one year parts and labor, 90 days on consumables
Extended warranty: none
Technical support: toll-free number, M–F 9–5
Other support services: none
For more information, circle 606 on reader service card.

Eric Brown is an associate editor for PC World. *Alan Southerton is a senior technical writer for Progress Software in Bedford, Massachusetts. Wes Nihei is an assistant editor for* PC World. *Sam Hagerty-Hammond is a San Francisco Bay Area computer consultant specializing in financial data base programming. Bill Taborchek is a New York–based consultant and computer writer.*

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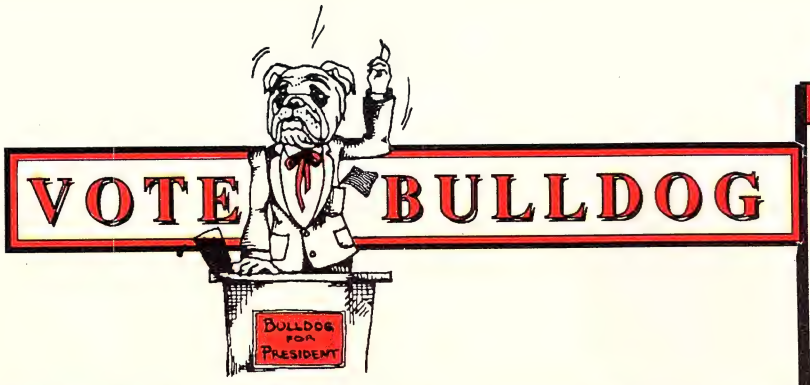

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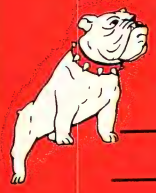

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192 **Sprint 1.0**
Borland's new budget word processor is crammed with features, but complicated formatting and a limited previewer will make potential buyers think twice.

194 **VP-Planner Plus 2.0**
Already a Best Buy in our eyes, this multidimensional spreadsheet's enhanced speed and new features make it look even better the second time around.

208 **PFS: First Publisher 2.0**
New templates for everything from business cards to multicolumn newsletters, along with improved printer support, fill out this low-end desktop publisher.

212 **GrandView 1.0**
Symantec dubs it a personal information manager, but *GrandView* is really a top-notch outliner with strong project-tracking tools built in.

218 **EasyCAD 2 2.05**
Feature-rich, fast, and flexible, the new release of this easy-to-learn drafting program equals much costlier rivals.

220 **HB-Browser**
Peek at data base records from your spreadsheet or word processor with Cauldron's RAM-resident utility. *Browser* comes in two configurations—both with healthy appetites for RAM.

Sprint 1.0

Word processor

PROS: Low price, permits multiple open files, easy to customize, choice of user interfaces

CONS: Awkward formatting, limited previewer, bugs

For a scant $200, Borland's *Sprint* stands up to word processors costing twice as much. Snap-on user interfaces give it the quick-change wardrobe of a chameleon, and a potent macro-programming language gives users unparalleled power to customize the program. Unfortunately, *Sprint*'s formatting is awkward and difficult, and the limited previewer fails to compensate for the editor's poor approximation of printed results. *Sprint*'s initial release is further hampered by a number of annoying bugs.

If formatting isn't a major concern, *Sprint* could be your ticket to fly. Loosely based on *WordStar* but with much more functionality, the editor is largely free of the bugs and design flaws that hamper the formatter. Block operations are well implemented, cursor movement is flexible, and as NSTL tests indicate, performance is fast. *Sprint*'s file management features are some of the best in the business. An auto-save feature saves text every 3 seconds, and the program loads into memory the last 24 files worked on, letting you quickly switch files and cut and paste among them.

More advanced editing tools are somewhat flawed. For example, the 100,000-word spelling checker includes a handy proof-as-you-type option, but it runs slowly and won't fix repeat misspellings. And the thesaurus is unable to adjust for plural or adverbial endings.

Much of *Sprint* incorporates a rich macro programming language, so the program offers a high level of customization. Any user can easily redefine command sequences, record macros and boilerplate text, or choose from 40 predefined macros. More experi-

enced hands can write and edit macros, customize menus, and even create new features and interfaces.

Such flexibility makes possible a feature unique to *Sprint:* alternative menu interfaces that mimic the command structures of *WordPerfect, Microsoft Word, WordStar, SideKick, FinalWord II,* and *EMACS.* These interfaces don't offer all the functionality of the originals—and in some cases won't let you access all of *Sprint*'s advanced features—but they could be useful for offices that hire temporary workers.

Sprint's three native interfaces (Tutorial, Basic, and Advanced) use Borland's trademark pop-up menus. Type a command's first letter (or highlight the command and press <Enter>), and well-designed menus cascade across the screen. But when you reach the twigs of the menu tree, defaults are frequently lacking, and you often have to type in programming commands.

Because *Sprint* is split between editing and formatting modules, what you see is nothing like what you get. To view even the most basic text formatting (such as double-spacing), users will find themselves constantly switching to a separate previewer. That utility is sadly lacking—you can't scroll backward, jump to a page, view a full page, display graphics, or preview specific elements. When you enter the previewer, *Sprint* lists formatting errors along with offending line numbers, but the error messages are cryptic and sometimes inaccurate. Annoyingly, if *Sprint* deems the errors severe, it won't let you print or even preview the file.

Sprint's editor/formatter split also spawns a messy screen display. Do a little formatting, and the screen quickly clogs with chunks of inverse video, displaying headers and footnotes verbatim at your cursor location. This makes it hard to read and edit text, and it's easy to pollute your layout with accidental additions or deletions.

The program's various formatting techniques are poorly integrated. After inserting a new ruler line to change formats, you then must cursor through it to specify margins or tabs. More precise settings can be chosen

JENNIE OPPENHEIMER

from a menu, but the changes aren't reflected on the ruler line or editing screen. And while *Sprint* provides some document-wide formatting, it lacks some key settings. If you want to justify or double-space your file, for example, you must repeat the command under each ruler line. You can also create tagged style sheets, but they require a firm grasp of the programming language; you can't create styles by example or via menus.

Sprint's many formatting options include page-break controls, snaking columns, and long-document features, but they're hard to use. Importing graphics requires Encapsulated PostScript (EPS) files, and you must embed PostScript commands to manipulate them. The print formatter supports numerous output devices, but it lacks both batch and background printing.

FEATURES EVALUATION

Sprint 1.0: Full-Featured but Awkward

Sprint's high-end features are attractive, but they aren't always easy to use.

	Sprint 1.0	Microsoft Word 4.0	WordPerfect 5.0
Editing			
Maximum number of windows	6	8	2
Undo command	◒[1]	●	◒[1]
Jumps to bookmark	●	○	○
Temporarily exits to DOS	●	●	●
Wild-card search	●	●	●
Searches control characters	●	●	●
Spelling checker/thesaurus	●	●	●
Cross-referencing	●	○	●
Redlining	○	●	●
Outliner	◒[2]	●	◒[2]
Mail merge	●	●	●
Creates index/table of contents	●	●	●
Macro learn mode/editor	●	●	●
Macro programming language	●	●	●
Formatting			
Style sheets	●	●	●
Conditional page breaks	●	●	●
Widow/orphan control	●	●	●
Automatic hyphenation	○	●	●
Leading control	●	●	●
Decimal tabs	●	●	●
Side-by-side/snaking columns	●	●	●
Both styles on same page	●	○	●
Graphics			
Imports graphics	◒[3]	◒[3]	●
Sizes, crops, rotates graphics	◒[4]	◒[5]	●
Automatic text flow around graphics	○	○	●
Page preview	●	◒[5]	●
Draws lines/text boxes/borders	●	●	●
Text boxes/borders	●	●	●
Printing			
Proportional spacing	●	●	●
Queues documents	○	●	●
Prints in background	○	●	●
Landscape printing	●	●	●
Supports PostScript	●	●	●

● Yes ○ No ◒ Deficient

[1] Recovers deleted text but does not reverse.
[2] Outliner doesn't support collapsible headings.
[3] Graphics can be imported at time of printing, but not viewed or manipulated.
[4] Automatically sizes graphics, but scaling, cropping, and rotating require PostScript commands.
[5] With included PageView utility.

Although a few opening-day jitters are to be expected in any initial release, *Sprint* proved unusually troublesome. Among other problems, screen refresh was unreliable, text occasionally overprinted, and margins often disappeared. File conversions sporadically failed to work, and when they did, tended to produce irrelevant ruler lines. Even if the bugs are squashed, *Sprint*'s awkward formatting interface may limit its appeal to budget-minded users who produce unadorned text. —*Eric Brown*

WHERE TO BUY

Sprint 1.0
Borland Int'l
1800 Green Hills Rd.
Scotts Valley, CA 95066
408/438-8400
List price: $199.95, six-user Network Pack $595
Requirements: 384K, DOS 2.00 or later version
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Technical support: unlimited, no toll-free number, M–F 8–5
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VP-Planner Plus 2.0

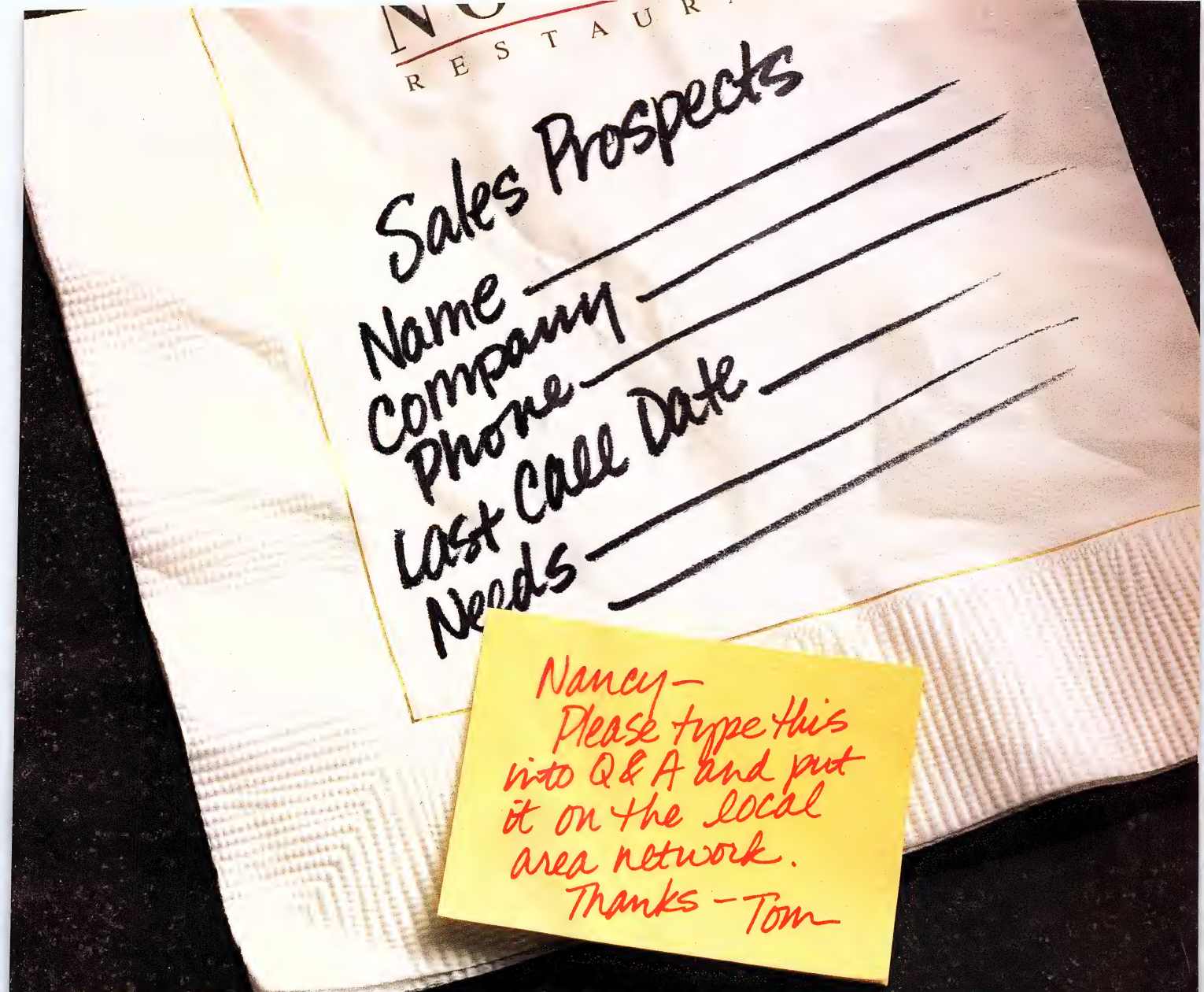
Multidimensional spreadsheet

BEST BUY

PROS: Very fast, imports ASCII data base files, inexpensive

CONS: Doesn't support extended memory

This spring, we ran a glowing review of Paperback Software's *VP-Planner Plus 1.0* and dubbed it a Best Buy (see *The Software Shelf, PCW*, May 1988). However, due to an editing error, we mistakenly headlined our review version 2.0. So when the new $249 version came out, we sent it to NSTL for testing using our upgraded benchmarks (see the sidebar "New Spreadsheet Tests—A Better Method"). The results are pretty impressive. Where version 1.0 consistently trailed *1-2-3*, version 2.0 gives it a run for the money.



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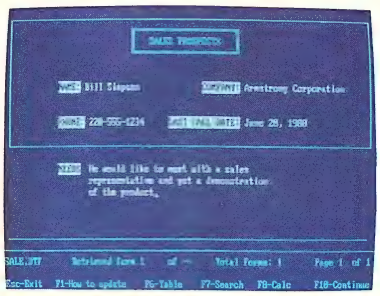

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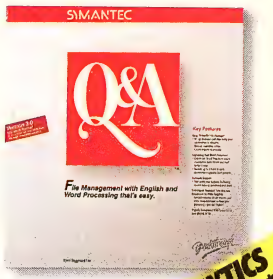

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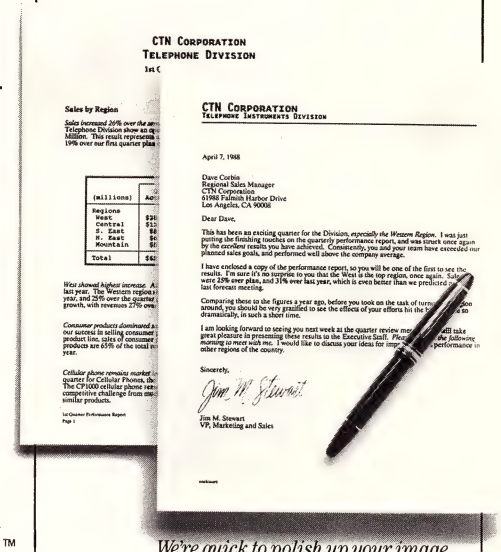

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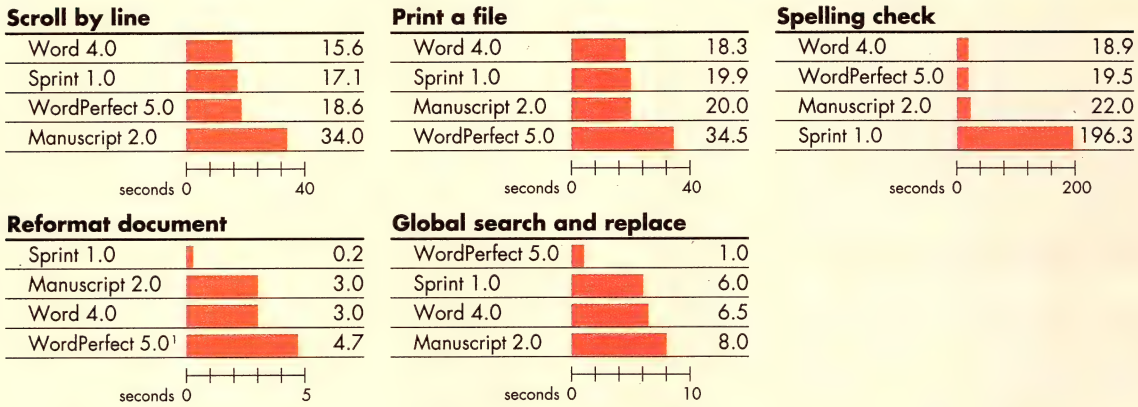
NSTL TEST REPORT

Sprint 1.0: True to its Name

In most speed tests with other word processors, Sprint keeps up with the best of them.



[1] This test measures the time required to issue the reformatting command and move to the end of the document. This command sequence compensates for WordPerfect's background reformatting.

All benchmarks were performed on an 8-MHz IBM AT with 640K of RAM and a 30MB hard disk running under DOS 3.20. All tests except the spelling check used an 8-page (480-line) text file consisting of groups of 4 characters separated by spaces (e.g., *aaaa bbbb cccc*). The file was formatted at 60 lines per page with margins set at 1 and 60. Two carriage returns followed every 9 lines of text. This pattern was repeated throughout the document. Times were measured from the keystroke initiating the test until control was returned to the user.

Scroll by line
This test measured the time required to scroll line by line from the top of the file to the end and then from the end back to the top. The two times were then averaged. The size of the keyboard buffer was increased with a utility program to allow 30-keystrokes-per-second input without filling the buffer. Without such a utility, times would have been greater.

Reformat document
The times to reformat the document after changing the right margin from 60 to 50, and then from 50 to 60, were averaged for each program.

Print a file
This benchmark used a device that simulates an infinitely fast printer, one not slowed by paper or printhead movement. The text file was "printed" to the device at the maximum speed supported by the program. Times with an actual printer would be greater.

Global search and replace
With the cursor positioned at the beginning of the text file, the program was instructed to automatically replace all 240 instances of *aaaa* with *AAAA*.

Spelling check
This benchmark recorded the time a program's spelling checker required to proof a 28,051-character ASCII file (thirty 14-line paragraphs) after the file had been read into each program and saved in that program's format.

Data based on tests designed and conducted by National Software Testing Laboratories (NSTL). All rights reserved.

VP-Planner Plus 2.0's speed is due mainly to the pairing of background with what Paperback calls *priority* recalculation. The first is pretty straightforward: The spreadsheet recalculates in the background while you continue to enter data and issue commands in the worksheet. Priority recalc is more intriguing: The program first recalculates the result of a command and whatever cells its operation depends on. (For example, if you choose a graph view and press <F10> to display it, *VP-Planner Plus 2.0* immediately recalculates the cells used for the graph ranges.) Next it recalculates all on-screen cells, and finally the rest of the worksheet. The effect? Users get recalc results when they need them and also quickly regain keyboard control.

Version 2.0's other improvements are welcome. It has gained an undo command, which reverses the effects of most previous operations—including accidentally erasing the entire worksheet. You can undo an undo, and even use undo to repeat macros, but the undo command itself can't be included in a macro; nor does it work with any operation that saves data to disk. Macro maniacs will love version 2.0's macro transcriber. It records keystrokes, stores them in a 240-byte buffer, then flushes them to a .PRN file. You can create up to ten Autokey macros (one

(continues)

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We could go on about the many features of Symphony 2.0—how its macros let you automate complex or repetitive tasks and create customized applications. How the word processor now has a spelling checker and text outliner. And how database and communications have been improved.

The bottom line is that Symphony is one high performance package that's made to be opened up.

Lotus Symphony 2.0

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NEW SPREADSHEET TESTS—A BETTER METHOD

Starting with this issue, *PC World* deploys an all-new suite of spreadsheet benchmarks. These tests were designed by National Software Testing Laboratories (NSTL), an independent test center in Philadelphia, to provide a more accurate picture of how well a spreadsheet will perform once it's installed in your working environment.

In support of our real-world benchmarking philosophy, the new test worksheet is a typical three-year business plan. With this worksheet as the guinea pig, NSTL tests spreadsheets in four critical areas: file-loading speed, data-editing speed, recalculation speed, and capacity.

BOTTOM-LINE RESULTS

The results are sometimes unexpected. For example, in our file-loading test of four popular spreadsheets—*1-2-3, Excel, Quattro,* and *VP-Planner Plus*—*VP-Planner Plus* bested all the others (although *1-2-3* and

(continues)

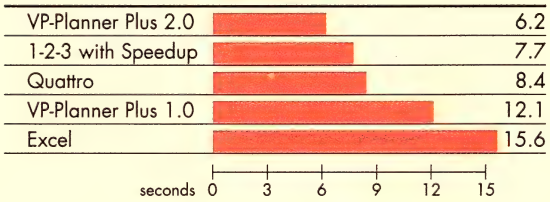
NSTL TEST REPORT

VP-Planner Plus 2.0: Faster Than Ever

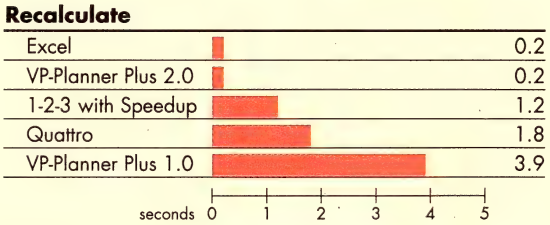
Version 2.0 of VP-Planner Plus pulls ahead of 1-2-3 in two out of three speed tests.

Conventional memory

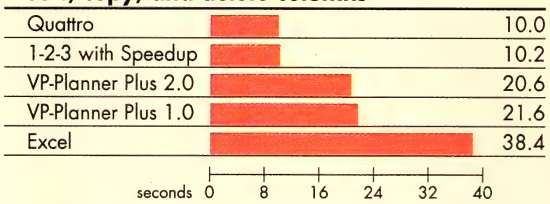
Load a worksheet



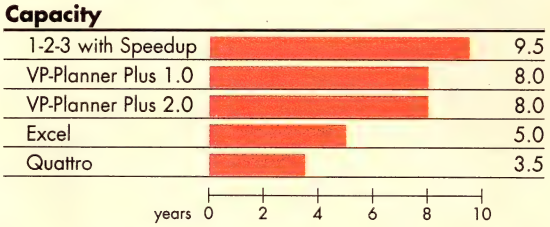
Recalculate



Insert, copy, and delete columns



Capacity



Benchmarks were performed on a 12-MHz Compaq Deskpro 286 with 640K of RAM and a 40MB hard disk; all tests were repeated using an Intel AboveBoard with 2.5MB of EMS v4.0 memory and with an 80287 coprocessor installed. The conventional memory tests were performed on a worksheet containing a three-year business plan. For the expanded memory tests, the business plan was expanded to include data for eight years. For all speed tests, time was measured until control was returned to the user.

Load a worksheet
This test measured how long it took to load the test worksheet.

Recalculate
This test measured how long it took the spreadsheet to recalculate after a new value was entered into cell B18 (Sales).

Insert, copy, and delete columns
This test measured the time required to insert blank columns (P1..AD195), copy other columns into the new columns (AE1..AR195 to P1..AD195), and then delete the copied columns. Each step was timed separately; then the times were added.

Capacity
This test measured worksheet capacity by counting how many additional years' worth of data could be added to the worksheet. If an entire year could not be added, an attempt was made to add six months.

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NEW SPREADSHEET TESTS

(continued)

Quattro were just seconds behind). File-loading tests in expanded memory told quite a different story: *Quattro,* for instance, slipped to last place.

To evaluate performance on a set of common editing tasks—inserting, copying, and deleting data—NSTL benchmarked how long each spreadsheet took to perform these operations on a group of columns. *Quattro* and *1-2-3* were neck and neck on this one, with *VP-Planner Plus* twice as slow and *Excel* almost four times as slow. In expanded memory tests *Quattro* outperformed *1-2-3,* while *Excel* continued to lag far behind. (*VP-Planner Plus* doesn't support expanded memory.)

SUMMING UP

In NSTL's new recalculation test, a key Sales cell is changed in the business plan worksheet; then the worksheet is recalculated. Because all tests are timed until cursor control is returned to the user, *Excel* and *VP-Planner Plus,* which support background recalculation, whipped the others on this test.

1-2-3 and *Quattro* were also fast, with speeds of less than 2 seconds. But in expanded memory, *Excel* was by far the fastest; *1-2-3* and *Quattro* once again were almost tied.

EVALUATING MEMORY USE

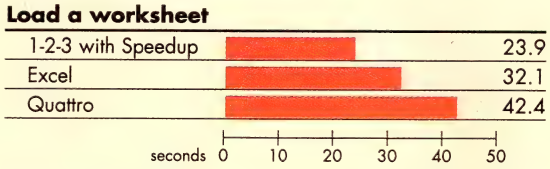
As worksheets grow, memory management becomes a key issue. In the capacity test, NSTL measured how many years of data could be added to the business plan. In conventional memory *1-2-3* did better than all the others, allowing 9.5 business years to be added; *VP-Planner Plus* came in second at 8 years. In expanded memory *Excel* performed far better than the others, with 71.5 years.

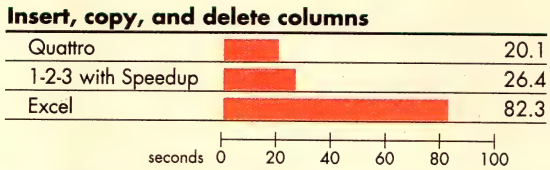
Our conclusions? If you have expanded memory, *Excel* is best for huge worksheets with heavy-duty recalculation requirements. *Quattro* is fast at data editing tasks but falls down in conventional memory capacity. *VP-Planner Plus 2.0* significantly surpasses version 1.0 in file loading and recalculation tests. Finally, *1-2-3* remains a strong overall performer. Of course, benchmarks are only one part of the story; for some users, power and ease of use may rival mere speed. —*Anita Amirrezvani*

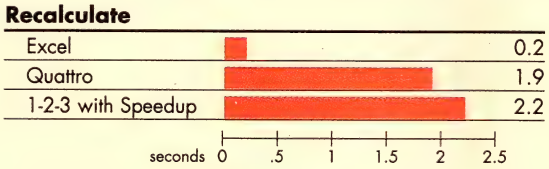
NSTL TEST REPORT

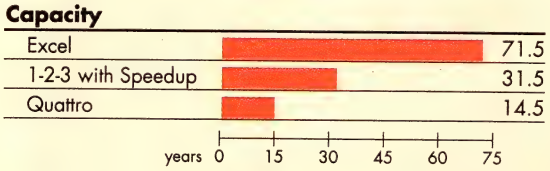
VP-Planner Plus continued

Expanded memory[1]









[1] VP-Planner does not support expanded memory.

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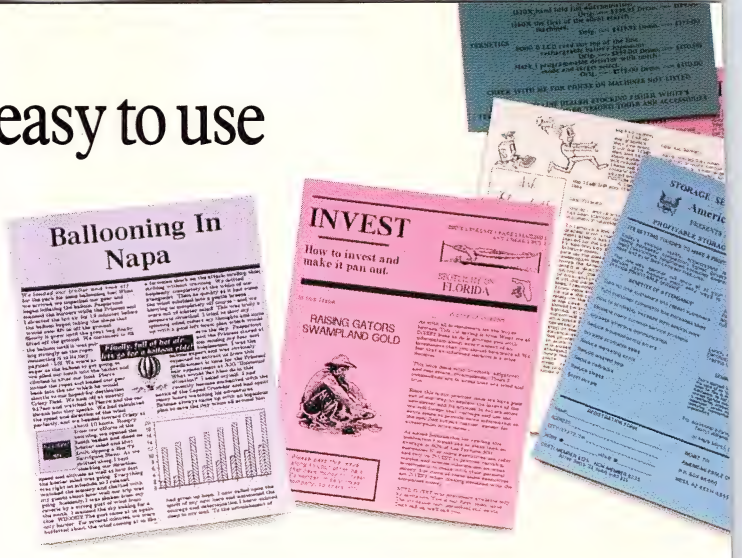

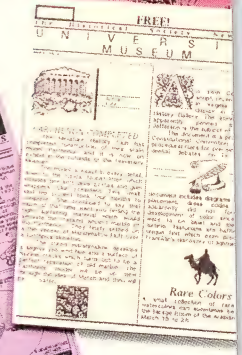

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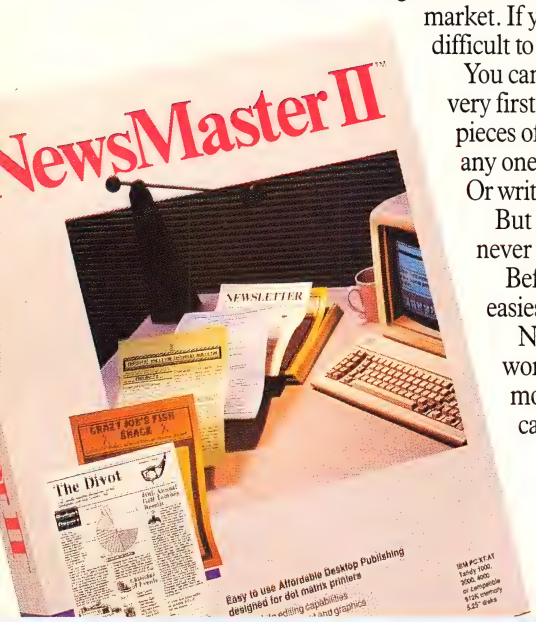

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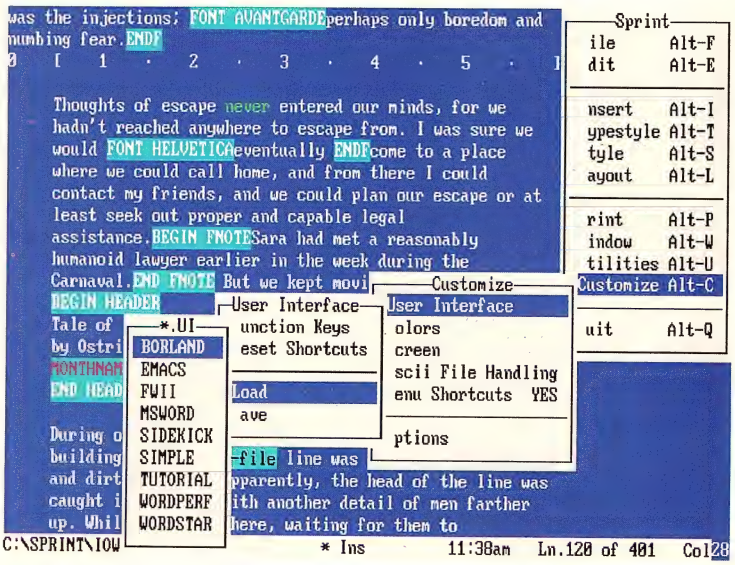

Sprint's menus are well designed, but a little formatting can clutter the editing screen with inverse video. Even worse, headers and footnotes are inserted at the cursor location.

per function key) for each .PRN file, and tie traditional label macros to them. Finally, *VP-Planner Plus*'s excellent multidimensional data base now reads ASCII data base files, provided they contain standard fields—either label, record, numeric, value, time, date, or skip column.

VP-Planner Plus still doesn't support extended memory. Since the program requires 384K RAM, this can limit the size of your worksheets, unless you use the program's multidimensional data base, which is limited in size only by free disk space.

Considering *VP-Planner Plus*'s reasonable price, speed, and excellent multidimensional data base, we're awarding it our Best Buy tag for the second time. —*Alan Southerton*

WHERE TO BUY

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Paperback Software Int'l
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Berkeley, CA 94710
415/644-2116
List price: $249
Requirements: 384K (448K for multidimensional data base), DOS 2.00 or later version
Not copy protected
Technical support: 90 days free (then $5 for first 5 minutes, $1 each additional minute), no toll-free number, M–F 9–5
Other support services: newsletter
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PFS: First Publisher 2.0

Low-end desktop publishing program

PROS: Fast, easy page layout for short documents; good laser printer and Hewlett-Packard DeskJet support; inexpensive

CONS: Inadequate for long documents, lacks style sheets, unimpressive dot matrix output

When *PFS: First Publisher* came out, it impressed us as a fast, easy-to-learn package, ideal for generating short documents such as booklets and newsletters (see *The Software Shelf, PCW,* December 1987). Costing just $99, Software Publishing's package boasted an accessible user interface and excellent design. However, *First Publisher 1.0* lacked full printer support and such long-document amenities as style sheets, multiple-page text flow, and running headers.

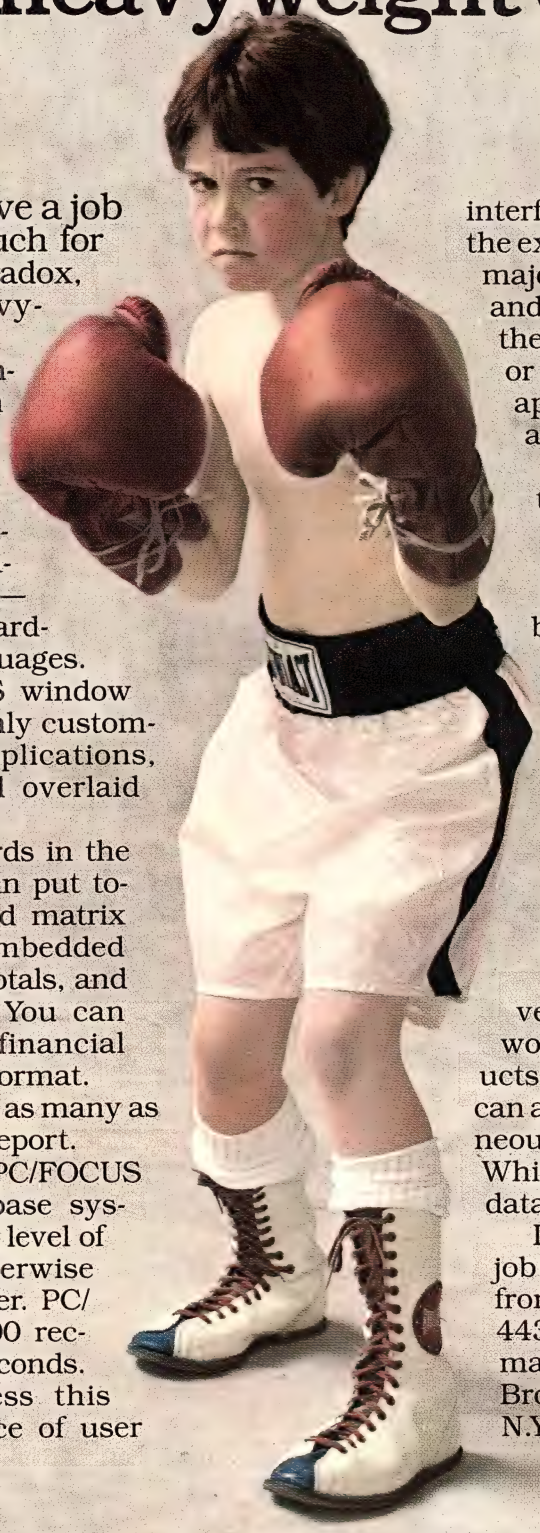
First Publisher 2.0 is faster, has better text import and laser support, and includes context-sensitive help and a number of helpful templates. Its price has also risen to $129.

First Publisher's layout tools haven't changed, but then they didn't need to. They're wonderfully easy to learn and use, whether you drive the program with pull-down menus or speed keys. To help lay out a document with varying numbers of columns, version 2.0 includes five templates for the most common multiple-column formats. Software Publishing also supplies templates for newsletters, invoices, flyers, lists, stationery, business cards, menus, and greeting cards. But the program still lacks style sheets.

First Publisher imports images from scanners that can be set to 72 dots per inch (dpi), so long as they're stored in a format the program can read: *PC PaintPlus, PC Paintbrush, Windows Paint, Logipaint, Publisher's Paintbrush,* or .MAC format files. Images can now be rotated in 90-degree increments, inverted, resized, and flipped. Version 2.0 ships with 150 clip-art images and a selection of 60 fonts, with more available in 2 font and 7 clip-art portfolios for $39 each.

First Publisher 2.0 supports the DeskJet (though not its soft fonts) and all Hewlett-Packard and Bitstream soft fonts. This is a

Can your lightweight database handle a heavyweight challenge?



When you have a job that's too much for dBASE or Paradox, turn to the real heavyweight. PC/FOCUS.

PC/FOCUS is the number one fourth-generation language, with its own powerful database system. It's complete enough to create the complex reports and applications that others can't—without resorting to hard-to-learn procedural languages.

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And you can draw on as many as 16 different files for one report.

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And you can access this power through a choice of user interfaces. A command mode lets the experienced user develop major applications quickly. A point-and-pick windowed interface lets the casual user make a query—or build a substantial application—using only the arrow keys and the enter key.

What's more, any application you develop in the FOCUS language can immediately be run on any of the larger computers supported by FOCUS.

PC/FOCUS includes modules for graphics, statistics, and communications. And there are optional modules including EQL—an English language interface, spreadsheets with goal-seeking capabilities, and interfaces to dBASE and other PC database systems.

There's also a MultiUser version of PC/FOCUS that works with the major LAN products. In a network, up to 32 users can access one database simultaneously without record lockup. While PC/FOCUS maintains your data integrity.

If you've got a heavyweight job to do, get some real muscle from PC/FOCUS. Call 1-212-736-4433, Ext. 3700. Or write Information Builders, Inc., 1250 Broadway, New York, N.Y. 10001.

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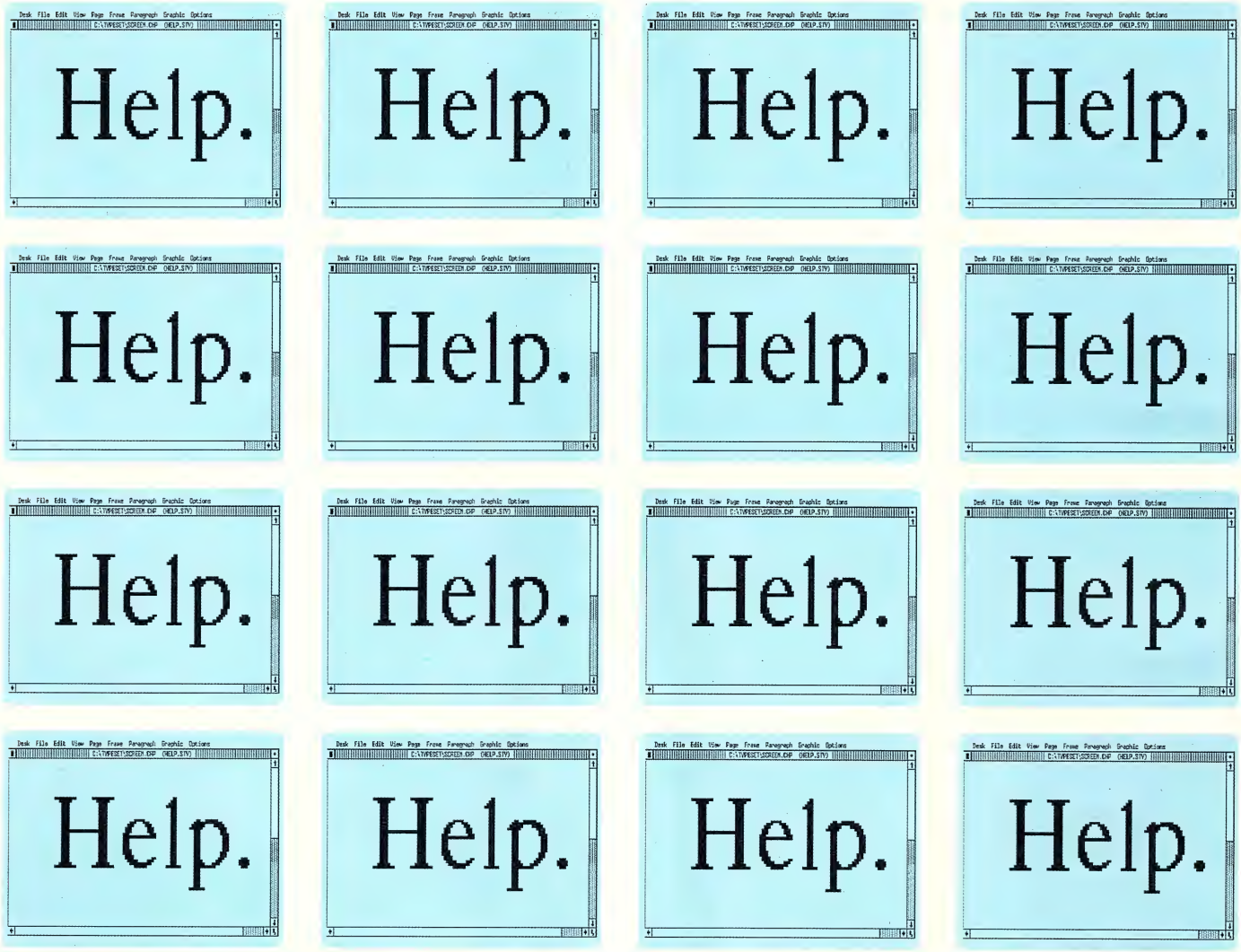

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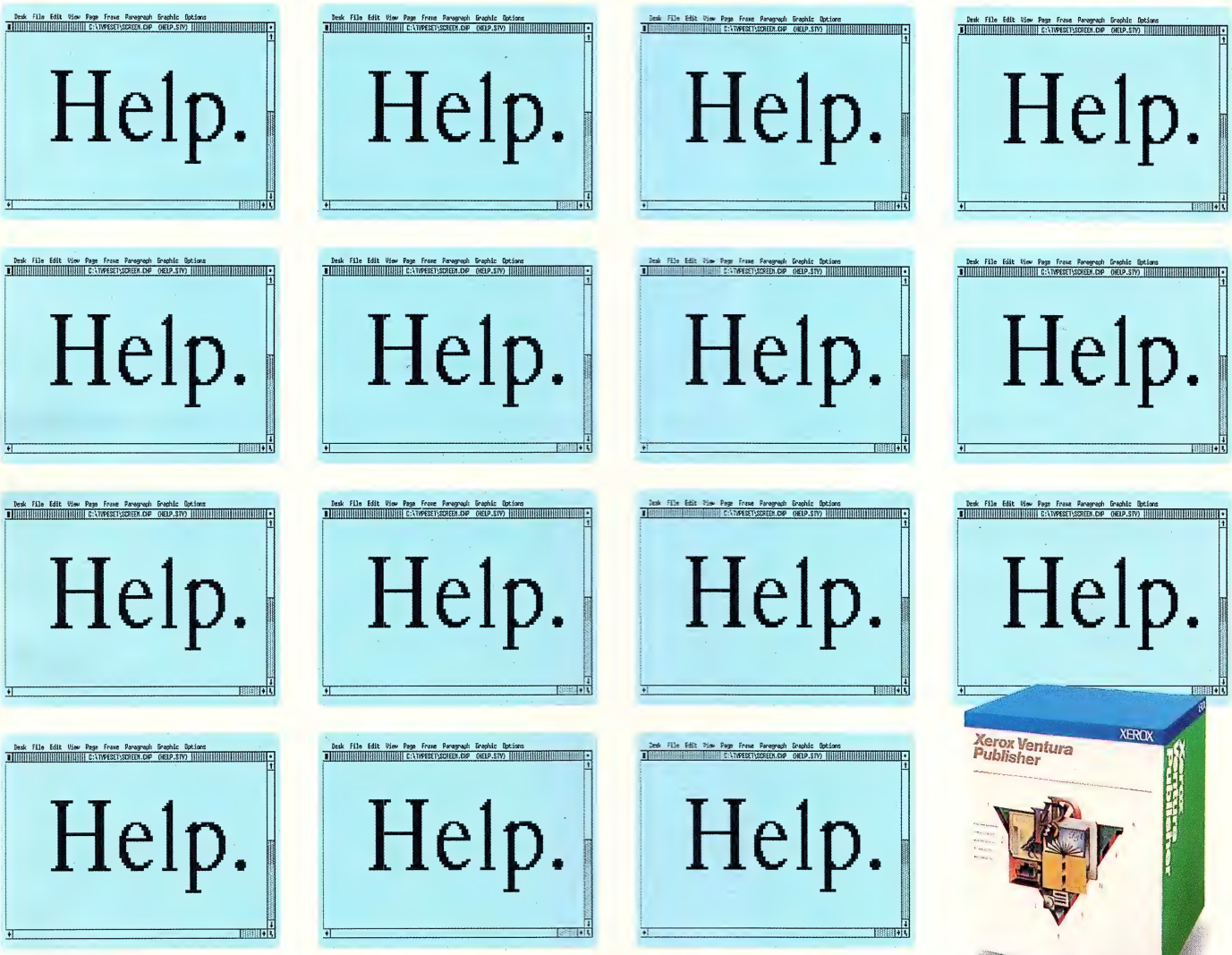

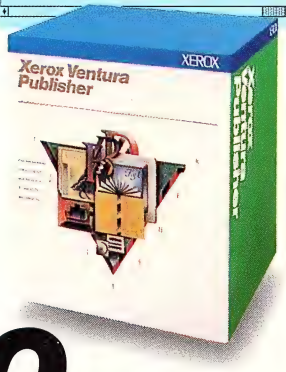

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FEATURES EVALUATION

VP-Planner Plus 2.0: Handy Additions

Version 2.0 has gained an undo command, priority and background recalc, and macro transcripts.

	VP-Planner Plus 2.0	VP-Planner Plus 1.0	1-2-3 2.01
Data entry and editing			
Reads/writes ASCII	●	●	●
Reads/writes .WKS and .WK1	●	●	●
Reads/writes .DBF	●	●	○
Undo command	●	○	◒[1]
Goto feature	●	●	●
Global search and replace	●	●	○
Wild-card searches	●	●	●
Underlining/boldface in cells	○	○	○
Invisible/hide feature	●	●	●
Background/priority recalculation	●	○	○
Minimal recalculation	○	○	◒[2]
Password protection	●	●	●
Supports mouse	○	○	○
Capacity			
Maximum number of rows	9999	9999	8192
Maximum number of columns	256	256	256
Maximum number of windows per screen	6	6	2
Maximum number of keys sorted concurrently	4[3]	4[3]	2
Supports expanded memory	○	○	●
Supports multidimensional data bases	●	●	○
Supports dynamically linked files	○	○	◒[1]
Supports math coprocessor	●	●	●
Reporting and graphs			
Maximum report width (in characters per line)	255	255	240
Automatic page numbering	●	●	●
Number of graph types	5	5	6
Number of colors supported	7	7	7
Free text on graphs	○	○	○
Prints sideways	●	●	○
Spooler	●	●	○
Macro/programming			
Macro libraries	●	●	○
Macro learn mode	●	●	◒[1]
Creates macro transcript files	●	○	○
Input statements	●	●	●
Step mode/trace cells option	●	●	●
DOS access from macro procedure	●	●	○
Reads/writes 1-2-3 macros	●	●	●

● Yes ○ No ◒ Deficient

[1] With Lotus's HAL. [3] Each key can contain multiple columns.
[2] With Lotus's Speedup.

big improvement over the anemic catalog of HP fonts in version 1.0. However, the program's dot matrix output is still poor, and dot matrix users will be better served by the first-rate fonts of Digital Research's *GEM Desktop Publisher.* In response to customer demand, Software Publishing has also added a driver for the Star Gemini 10X printer.

The package's overall speed, which was satisfactory in version 1.0, has been noticeably enhanced. Tests showed a 150 to 300 percent speed gain in such tasks as jumping to the second page in a two-page ASCII file and placing a graphic in the corner of a page with text wraparound.

For a small business with a laser printer, *First Publisher* is an attractive, inexpensive way to produce occasional short-document layouts. If your work runs to double-digit pages or you're tied to dot matrix output, you'll need to consider a beefier (and more expensive) program. —*George Beinhorn*

WHERE TO BUY

PFS: First Publisher 2.0
Software Publishing Corp.
1901 Landings Dr.
P.O. Box 7210
Mountain View, CA 94039-7210
800/647-7403, 415/962-8910
List price: $129
Requirements: 512K, two disk drives, DOS 2.10 or later version, graphics adapter (mouse recommended)
Not copy protected
Technical support: unlimited, no toll-free number, M–F 8–4
Other support services: quarterly newsletter free to registered users, CompuServe forum (GO SPCFORUM)
For more information, circle 672 on reader service card.

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CONS: Weak word processor, limited outline size

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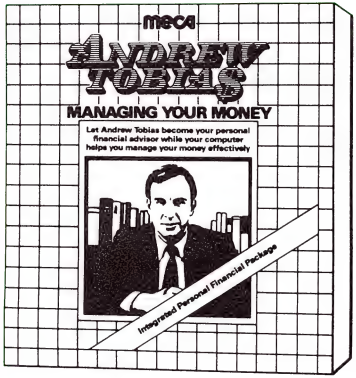

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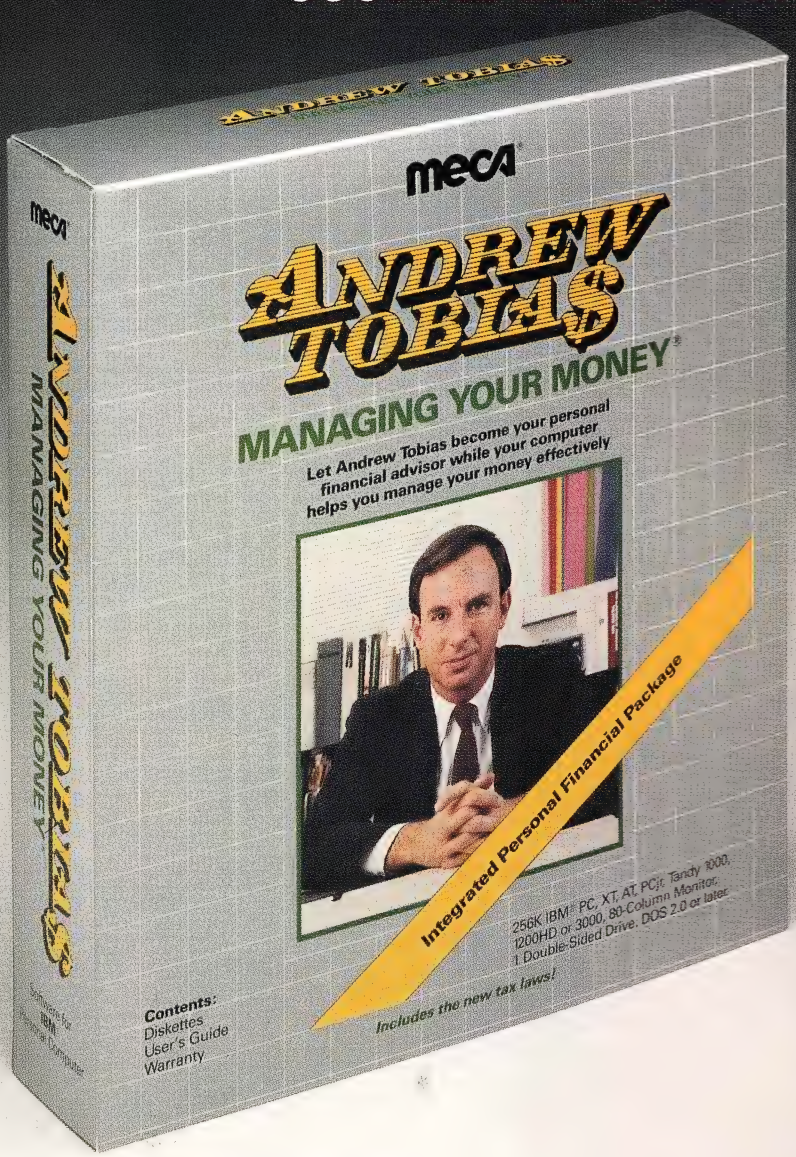

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New York Daily News, "Money Talks," October 4, 1987

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Options:
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Drive Options	Mono†	CGA	EGA	VGA
Single Floppy	$669	$839	$1068	$1168
Dual Flopppies	$749	$919	$1148	$1248
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† Add $49 For 14" Flat Screen Monitor

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$1969 *Monitor not included*

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- 80386 16/8 MHz Norton SI 17.6
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- 200W Power Supply
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- 8 Expansion Slots
- 101 Key, Touch & Click Keyboard
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- Swan Setup & Utilities Diskette,Full Documentation

Options:
- Upgrade to 2MB
- 80387 Coprocessor
- SWAN/MS-DOS (3.3) add $89

386/16	VIDEO OPTIONS			
Drive Options	Mono	14"Flat Mono	EGA	VGA
Single Floppy	$2199	$2168	$2518	$2618
w/40MB Seagate #ST-251 HD	$2499	$2548	$2898	$2998
w/80MB Seagate #ST-4096 HD	$2799	$2848	$3198	$3298

SWAN 386/20

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- Phoenix BIOS V 3.1
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- 80287 & 80387 Coprocessor Socket
- 200W Power Supply
- 1.2MB Floppy Drive
- Ports: 1 Serial, 1 Parallel, 1 Game
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Drive Options	Mono	14" Flat Mono	EGA	VGA
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```
File  Edit  Window  View  Reorganize  Print  Layout  Categories  Special
C:\GV\TUTORIAL\PROJECT2 ------------ Position=2.40" ---------- INS ------- 8k --- 1
+  A. Introduction Plan: Project Centurion
+     1. Public Relations Events
+        a. Press Releases
-           1) Press Release One: Product Announcement
               Announcing the release of the product, pricing,
               specifications, availability.  Circulate to entire  press
               list.
-           2) Press Release Two: Installation Story
               Detail a recent installation and success story for the
               Centurion Security System.  Look out for users of the product
               who would be willing to enter into a promotion and endorsement
               for the product. Circulate to major publications only.
+        b. Press Interviews
+           1) Security Magazine Interview
-              a) Mary Millicent, Executive Editor
+           2) Sunrise Magazine Interview

 Date:  6/01/1988   Priority: Low
 Person Responsible: Bob
 Project Type: Materials
 Budget/Line Items: Public Relations

   Choose a Category: Type an Assignment; SPACE to Edit; TAB to List      171k
```

Category assignments can be attached to each item in a GrandView outline, and you can create as many categories as you like, from completion dates to persons responsible for tasks.

and Symantec's *GrandView* is no exception. Designed to track sales reports, project plans, schedules, notes, and correspondence, the program grafts an indifferent word processor and a clever project-tracking feature onto what must be the most powerful outliner on the market. *GrandView* can't cross-reference data as elegantly as *Agenda*, but if you're neat by nature, it can help you keep on top of things.

Like Symantec's other outliner, *ThinkTank*, *GrandView* lets you make dynamic copies of headers: Change one and the clone changes as well. You can also expand and collapse subheads, zoom to a portion of an outline, sort and gather subheads, and so forth. But *GrandView* adds a lot more.

Mouse support makes manipulating headings a breeze. You can open up to nine outlines at once, view multiple outlines on screen, and easily switch between them. (A clipboard lets you move both headings and text.) Finally, the program offers a wide variety of preset outline modes.

But *GrandView*'s strength as a project planner stems from its Category function, which lets you instantly reorganize outlines according to criteria you define. This is where careful planning pays off. Say you're outlining the tasks involved in a major advertising campaign. As you enter items, you may assign each one a priority level, a completion date, a person responsible, and so on. Turn to the Category view, and you'll see a group of boxes showing the categories you've created and the entries under each one. Highlight the Person Responsible category, for example, and *GrandView* will display all the people you've assigned work to. Pick a name and any outline tasks assigned to that person will appear.

GrandView comes with a word processor and a 100,000-word spelling checker, but it's not going to wean anybody from *WordPerfect*. Function keys are unavailable for basic editing chores (they're reserved for outline use), and you'll search in vain for such features as a macro glossary, a ruler, a column mode, or windows. To get these, you're stuck using another word processor and copying the results in ASCII format to your outline.

GrandView offers excellent printer support, and it's easy to specify fonts for different levels of the outline. The program accepts *ThinkTank* and *Ready* files automatically and can convert files from *PC-Outline*. Unfortunately, *GrandView* outlines are limited by available RAM, and the program doesn't make use of expanded memory.

GrandView is a top-notch outliner, and its Category view is dandy for sorting anything from deadlines to people in charge of tasks. The program's word processor still needs major improvement, but *GrandView* will suit anyone whose management needs run to bulleted lists and extensive supporting references. —*Patrick Marshall*

WHERE TO BUY

GrandView 1.0
Symantec Corp.
Living Videotext Division
117 Easy St.
Mountain View, CA 94043
415/964-6300
List price: $295
Requirements: 256K, two disk drives, DOS 2.00 or later version
Not copy protected
Technical support: unlimited, no toll-free number, M–F 9–4
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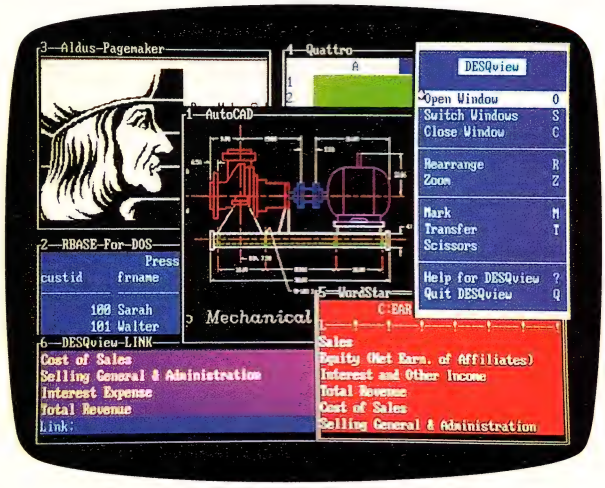
DESQview™ is the operating environment that gives DOS the capabilities of OS/2.™ And it lets you, with your trusty 8088, 8086, 80286, or 80386 PC, leap to the productivity of the next generation. For not much money. And without throwing out your favorite software.

Add DESQview to your PC and it quickly finds your programs and lists them on menus. So you can just point to the program, using keyboard or mouse, to start it up. DESQview knows where that program lives. And what command loads it.

For those who have trouble remembering DOS commands, it adds menus to DOS. It even lets you sort your files and mark specific files to be copied, backed-up, or deleted— all without having to leave the program you're in.

Best of all, DESQview accomplishes all this with a substantial speed advantage over any alternative environment.



Multitask beyond 640K.

When you want to use several programs together, you don't have to leave your current program. Just open the next program. View your programs in windows or full screen. Open more programs than you have memory for. And multitask them. In 640K. Or if you own a special EMS 4.0 or EEMS memory board, or a 386 PC, DESQview lets you break through the DOS 640K barrier for multitasking. You can start 1-2-3 calculating and tell Paradox to print mailing labels while you're writing a report in Word Perfect, or laying out a newsletter in Ventura Publisher, or designing a building in AutoCAD.

For programmers, DESQview's API, with its strengths in inter-task communications and multitasking, brings a quick and easy way to adapt to the future. With the API's mailboxes and shared programs, programmers are able to design programs running on DOS with capabilities like those of OS/2.

DESQview even lets you transfer text, numbers, and fields of information between programs.

Fulfill the 386 promise.

For 80836 PC users, DESQview becomes a 386 control program when used in conjunction with Quarterdeck's Expanded Memory Manager (QEMM)-386—giving faster multitasking as well as virtual windowing support.

And when you use DESQview on an IBM PS/2™ Model 50 or 60 with QEMM-50/60 and the IBM Memory Expansion Option, DESQview gives you multitasking beyond 640K.

Experts are voting for DESQview. And over a million users, too.

If all of this sounds like promises you've been hearing for future systems, then you can understand why over a million users have chosen DESQview. And why *PC Magazine* gave DESQview its Editor's Choice Award for "The Best Alternative to OS/2," why readers of *InfoWorld* twice voted DESQview "Product of the Year" why, by popular vote at Comdex Fall for the last two years in a row, DESQview was selected as "Best PC Environment" in *PC Tech Journal's* Systems Builder Contest.

PC MAGAZINE EDITOR'S CHOICE NOV. 24, 1987

INFO WORLD 1986 AND 1987 PRODUCT OF THE YEAR

DESQview lets you have it all now.

DESQVIEW SYSTEM REQUIREMENTS:
IBM Personal Computer and 100% compatibles (with 8086, 8088, 80286, or 80386 processors) with monochrome or color display; IBM Personal System/2• Memory: 640K recommended; for DESQview itself 0-145K• Expanded Memory (Optional): expanded memory boards compatible with the Intel AboveBoard; enhanced expanded memory boards compatible with the AST RAMpage; EMS 4.0 expanded memory boards•Disk: two diskette drives or one diskette drive and a hard disk•Graphics Card (Optional): Hercules, IBM Color/Graphics (CGA). IBM Enhanced Graphics (EGA), IBM Personal System/2 Advanced Graphics (VGA)• Mouse (Optional): Mouse Systems, Microsoft and compatibles• Modem for Auto-Dialer (Optional): Hayes or compatible• Operating System: PC-DOS 2.0-3.3; MS-DOS 2.0-3.2• Software: Most PC-DOS and MS-DOS application programs; programs specific to Microsoft Windows 1.03-2.03, GEM 1.1-3.0, IBM TopView 1.1• Media: DESQview 2.0 is available on either 5-1/4" or 3-1/2" floppy diskette.

YES! I need increased productivity now!

Qty	Product	Format	Price Each	Totals
	DESQview 2.0	❑5-1/4 ❑3-1/2	$129.95	
	QEMM-386	❑5-1/4 ❑3-1/2	$59.95	
	QEMM-50/60	❑5-1/4 ❑3-1/2	$59.95	
	Shipping & Handling	$5 in USA/ $10 outside USA		
	Calif Residents add 6.5%			
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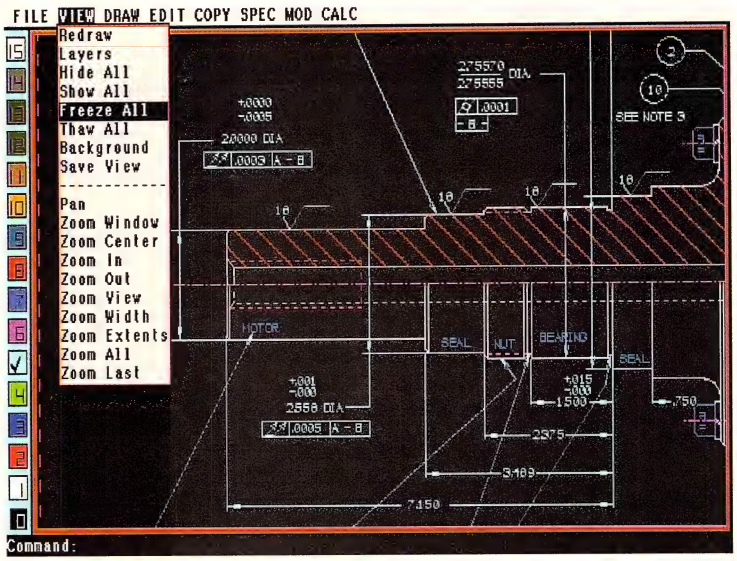

In this mechanical detail drawing, EasyCAD 2's menu headings at the top of the screen can be changed to suit the user, and new headings can be added as required.

EasyCAD 2 2.05

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PROS: Fast, powerful, flexible, easy to learn, inexpensive

CONS: Lacks nested zooms, some cross-hatching limitations

With *EasyCAD 2* version 2.05, Evolution Computing has not only revolutionized the low-end CAD market, it bids fair to threaten the high. The easy-to-learn program is blindingly fast, and its flexibility, wealth of features, and excellent user interface match those of professional programs costing thousands of dollars more. With *EasyCAD 2* you can easily handle 8000 entity files in 640K of base memory, and you can use floppy-based systems just as effectively as hard disk systems for drawing and editing. However, the program lacks a nested zoom facility, which lets you zoom in and out while drawing.

EasyCAD 2 supports an array of digitizers, pen plotters, laser and dot matrix printers, and ultra-high-resolution graphics boards. A DOS shell is included, as are file translation utilities for *Ventura Publisher* and *PageMaker*. Unlike Foresight Resources' competing *Drafix*, *EasyCAD 2* lets you modify its menus with any ASCII text editor.

Because *EasyCAD 2* uses pulldown menus, practically the entire screen is open for drawing. When you need to change colors, a set of 16 color icons along the left edge lets you switch instantly, even while placing a line or arc. A prompt line along the bottom of the screen echoes your commands and indicates the next input required. It also provides cursor feedback in either absolute, relative, or relative polar coordinates.

EasyCAD 2 provides a complete set of basic construction elements. Its 24 standard fill (hatch) patterns work with a variety of figures, whether bounded or not. Hatch patterns automatically match up whenever two hatched areas abut or overlap, and expand if the hatched entities are stretched or scaled. *EasyCAD 2* can't build hatched areas out of simple lines and arcs, however.

In addition to the usual rectangular grids and snaps, the program offers an extensive set of object snaps (command modifiers) that let you pick off endpoints, centers, midpoints, intersections, angles on arcs and circles, and corners of polygons as needed.

The program's basic editing command set is quite complete, and its selection of Boolean options for choosing items to edit is outstanding. You can select items individually, by color, by layer, by window (box), or by item type, or simply reselect the last item worked on. Then you go on to chain or deduct these selection criteria indefinitely. Need to move all but two of the red polygons on layer #225? No sweat. You can always see exactly what items you've chosen, because once selected, they change to a preset color.

Nor does *EasyCAD 2* skimp on dimensioning and text handling. All standard dimension types are associative, which means that the dimension text and witness lines change automatically to match geometry whenever a dimensioned entity is stretched or scaled—a tremendously useful, timesaving feature. Formats include vertical, horizontal, parallel, and angular dimensions, and the standard formats can be augmented with the program's macro language. You can edit text without erasing it, place it at any size or angle in several standard fonts, dynamically drag it into place, and even scale it on the fly.

Finally, *EasyCAD 2* is quick. When loading files, regenerating circles and diagonals, and zooming in to a single line or letter, for example, *EasyCAD 2* was over ten times faster in our tests than *AutoCAD 9.0*.

For 2-D design and drafting, *EasyCAD 2* is very nearly the equal of such high-end

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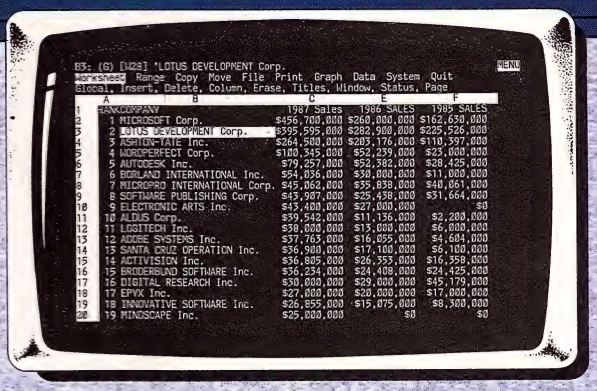
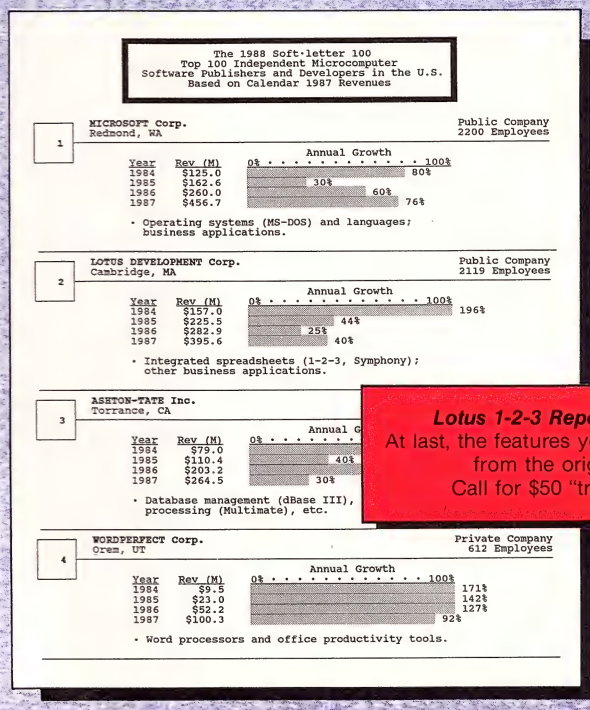


◀ A Lotus database is a range or an entire worksheet having field names in the first row and records of data in rows below.



◀ A report is any printout or screen display of data from your database. Anything beyond simple listings of data requires complex macros, or can't be done with Lotus.

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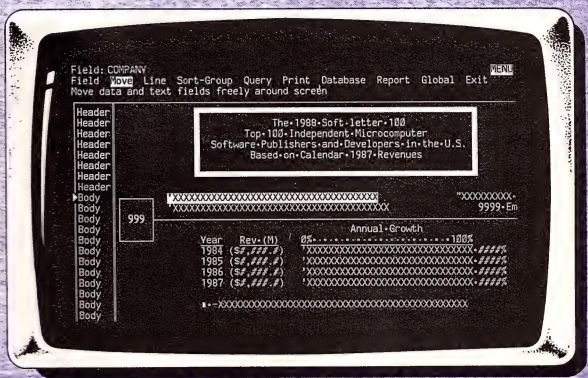

◀ A report writer is a tool that lets you specify what data to select, what additional calculations to perform, where to place everything, and exactly how it should look.

Trademarks: Lotus, 1-2-3, Symphony, Lotus Report Writer by Lotus Development Corporation; IBM by International Business Machines Corporation; dBASE by Ashton-Tate; R&R Relational Report Writer and R&R Worksheet Report Writer by Concentric Data Systems, Inc.

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programs as *AutoCAD*, *VersaCAD*, and *Anvil-1000*. Considering its low price and ease of use, it's an unbeatable value. —*Steven Lord*

WHERE TO BUY

EasyCAD 2 2.05
Evolution Computing
437 S. 48th St. #106
Tempe, AZ 85281
602/967-8633
List price: $169.95
Requirements: 512K, DOS 2.00 or later version, graphics card, mouse (math coprocessor recommended)
Not copy protected
Technical support: unlimited, no toll-free number, M–F 9–5:30
Other support services: none
For more information, circle 674 on reader service card.

HB-Browser

RAM-resident dBASE browser

PROS: Hot-key access to dBASE data from other applications, elegant and intuitive user interface

CONS: Requires a lot of RAM, doesn't support non-dBASE index formats

Ever long to pluck a customer address or invoice number from your *dBASE* files without leaving a spreadsheet or word processor? Meet Cauldron's *HB-Browser*, a slick RAM-resident utility that opens windows into .DBF data files. *Browser* is so easy to use, even *dBASE* novices will love it. But be warned: In its read-only configuration, *Browser* requires a healthy 155K of RAM (in a second configuration that lets you edit the data, it gobbles up 187K). In addition, it doesn't support such non-*dBASE*-compatible index formats as *Clipper* or *Foxbase+*.

Browser's user interface is elegant and logical, with pulldown menus and point-and-shoot file selection. You can open up to ten screen windows into as many as ten *dBASE* files (including multiple windows into the same file) and see the records in the order of any available index. Data appears in a row-and-column format, and the screen scrolls quickly and smoothly. You can execute instant FINDs, search through the data with LOCATE, and SET filter conditions for viewing records by entering a standard *dBASE*-language logical expression. Beware of filtering out all but a few records in a large file, however; *Browser* is even worse than *dBASE* in spinning your hard disk through the entire file, resulting in infuriating delays.

Browser lets you cut and paste all the data from one record (or everything displayed in a window) directly into a worksheet or word processing document. This is a one-way facility, though; *Browser* can't move worksheet or text data from the screen to a *dBASE* record. If you select *Browser*'s larger configuration, you can change the data in a selected record at will. Just be careful: There's no data validation feature. To speed data retrieval, you can use macros to automatically bring up a preset environment of data files, indexes, and window locations. Field names and structures are also available at a keystroke, a useful reference when creating *dBASE* programs and reports.

The only thing wrong with *Browser* is its appetite for memory. But if you can spare the RAM, you'll soon be spoiled by *Browser*'s instant access to your *dBASE* data. —*Alan Schwartz*

WHERE TO BUY

HB-Browser
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3204 Adeline St.
Berkeley, CA 94703
415/654-3361
List price: $99
Requirements: 512K (640K recommended), hard disk, DOS 2.00 or later version
Not copy protected
Technical support: unlimited, no toll-free number, M–F 9–5
Other support: 30-day money-back guarantee
For more information, circle 675 on reader service card.

Eric Brown is an associate editor for PC World. *Alan Southerton is a senior technical writer at Progress Software in Bedford, Massachusetts. George Beinhorn is a freelance writer in Nevada City, California. Patrick Marshall edits the Commentary Page of the* Oakland Tribune. *Steven Lord is a mechanical engineer and freelance writer living in Tewksbury, Massachusetts. Alan Schwartz is a data base programmer/analyst in the San Francisco Bay Area.*

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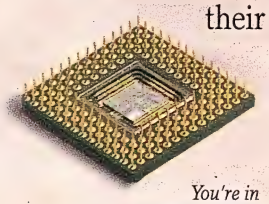

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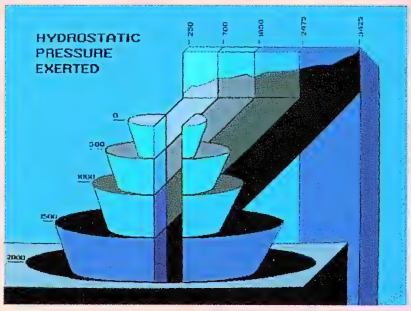

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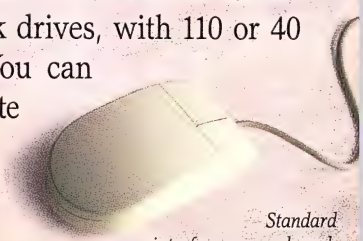

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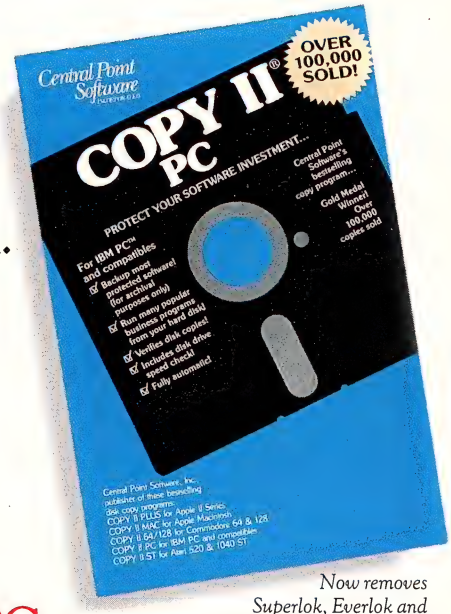

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BEYOND E-MAIL: THE GROUPWARE POTENTIAL

PC NETWORKS HAVE HOUSED ONLY TRADITIONAL APPLICATIONS SO FAR, BUT "GROUP PRODUCTIVITY" PACKAGES PROMISE TO PULL NEW TYPES OF OFFICE FUNCTIONS ON THE NET.

ERIC BENDER

JAVIER ROMERO

As hundreds of thousands of PCs link up on local area networks, almost every package that can live on a net gets promoted as "group productivity" software. There's a reason for the hype—even rudimentary information sharing can provide significant benefits for work groups—and the reason will become clearer with the arrival of packages that build on net strengths in novel ways.

So far, most net packages are repeating patterns of evolution already well known on minicomputers and bigger machines. Upcoming data base management systems offer prime examples: Building on OS/2, they're moving upscale to become full multiuser relational systems, supporting various degrees of transaction processing with robust recovery schemes. Similarly, word processing packages are incorporating multiuser annotation and merge functions, along with capabilities for tracking and cataloging revisions, thus moving into what vendors of traditional office automation call document processing (see "The Work-Group Ethic," *PC World*, October 1987).

Electronic mail, an addictive office automation staple that makes telephone tag obsolete, is appearing in mainstream applications like Ashton-Tate's *Framework* and Tandy's *Professional DeskMate.* And everyone from tiny start-ups to major players like WordPerfect are selling packages that supplement E-mail with scheduling, calendaring, and other goodies.

Slowly and painfully, the industry is creating relatively compatible and very powerful OS/2 network system platforms that will gracefully handle jobs in situations where DOS would flame out. As those platforms arrive and network hardware costs drop, the distributed power, flexibility, and graphics strengths of PC nets will recast office automation for the nineties.

We're already seeing the first pioneers: innovative applications with new weapons to attack business problems. According to Eric Sall, product director for Lotus's upcoming *Notes*, some of these packages will give users "more dynamic, subjective, and opinionated ways for information to be brought into the process." Other software will help users cooperate on many tasks now mired in manual mode. None of these products have hit store shelves yet, but they're coming.

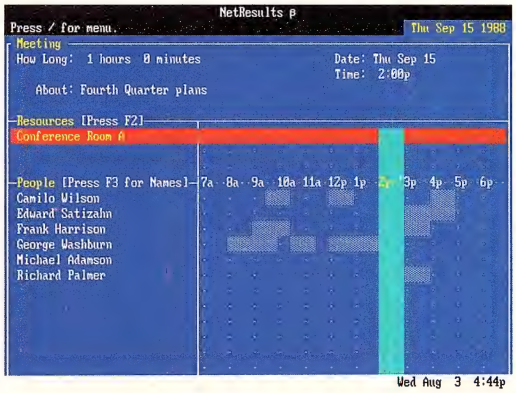
RESTRUCTURING E-MAIL

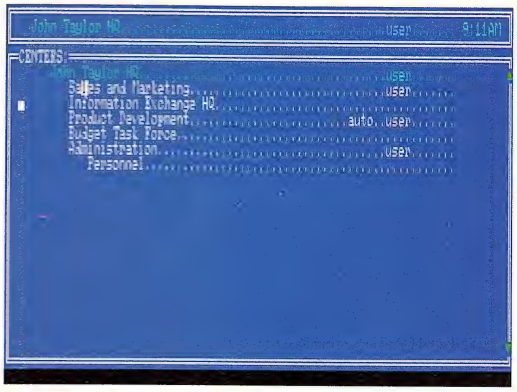
Electronic mail is as popular this year as jokes about presidential candidates. Customers are most anxious to find ways to link multiple E-mail systems. Vendors, though, are also quietly producing net applications that combine E-mail with other functions built atop data bases.

Higgins, a veteran package from Conetic Systems in San Leandro, California, includes scheduling, to-do list, phone messaging, and expense reporting modules. Miami-based Data Access's *Office Works* pushes calendaring, filing, phone messaging, and document control features. *WordPerfect Office for PC Networks* from WordPerfect in Orem, Utah, offers an application shell along with notebook, scheduling, and desktop accessory features. Likewise, Chronos Software of San Francisco has created a multiuser version of its *Who/What/When Office* package that performs project, time, and personnel management.

Electronic sharing of the familiar pocket personal organizer is a common theme. "People understand that concept," says Camilo Wilson, chairman of Lifetree Software in Monterey, California. Lifetree's *Net Results* is a memory-resident net package that tightly integrates E-mail, scheduling/calendaring, and work-flow management functions. Unlike plain vanilla E-mail, says Wilson, *Net Results* "lets you build as much structure as you want." Like its competitors, *Net Results* gives you a choice of responses with certain messages; the scheduler, for example, lets you accept or decline a meeting.

Voice annotation, another service that can tag along with E-mail, comes with Forum Systems' *PC/Forum*. The Santa Barbara, California, firm has been working on offbeat office software throughout the decade—first, with executive information systems; now, with a network package that runs under Hewlett-Packard's *NewWave* and delivers an integrated portfolio of basic office facilities.





Left: Lifetree's Net Results aids scheduling. Right: Coordination Technology's DOS prototype exploits "work centers."

CONFERENCE CALLS

With a few added hooks for swapping messages among multiple users, E-mail can be incorporated into bulletin boards for informal electronic publishing. Computer conferencing goes two steps further. "You need to support chains of discussion, with facilities to navigate through the chains," says Gil Kirkpatrick, vice president for product development at Trellis Group in Hopkinton, Massachusetts. "You also want to be able to do global searching."

Like many of its peers, Trellis's *TimeTalk* calendaring and scheduling application is evolving in that direction. *Cross/Point* from Cross Information in Boulder, Colorado, has already arrived. But Lotus's *Notes* is the package most people will watch.

Notes is designed for sharing information flexibly among work groups—running ongoing discussion/action groups and letting users tune in at convenient times. Lotus chairman Jim Manzi says the package targets those who *don't* enjoy "a perfect work group—that's ten people who are always at their desks, don't travel, work the same hours, act as an autonomous isolated group, have no matrix structure with other groups in the larger enterprise, and have a manager whose door is always open. Relax any of these constraints, and you need something like *Notes*."

Already used by hundreds of employees at Lotus Development Corporation, the software often makes meetings unnecessary. Promising applications include project tracking, for keeping an eye on complex marketing programs and conferences, and broadcasting of information such as a company handbook. Other functions can include holding group discussions, such as when brainstorming product ideas, and following the history of events, as in tracking meeting agendas and minutes.

"*Notes* is limited only by the creativity of the people who buy it," Manzi maintains. Likely clients range from executive/secretary teams to sizable intercontinental discussion groups—for which *Notes* does fancy footwork, connecting multiple nets and tackling potentially nasty security problems.

Lotus has shown a *Windows*-based prototype of *Notes*, with snazzy graphics and some *Agenda*-like characteristics (including forms for input and "views" for organizing information). The commercial product, due next year, will require OS/2 with the Presentation Manager. Lotus is also expected to crank up a *Windows* front end for DOS users.

CONNECTION MACHINES

Whereas *Notes* encourages relatively informal jottings, *Staffware* from FCMC in Berkeley, California, exudes grim corporate purpose. Built to automate paper flow, *Staffware* follows a task flowchart and prods users to fill out forms. "Reminders are issued when allocated deadlines are missed," says President Tony Kobine. FCMC is polishing *Calypso*, an OS/2-based successor to *Staffware* that integrates other applications and tools. "We think of the computer as a utility that's there to remind people," Kobine comments.

The Coordinator from Action Technologies in Emeryville, California, coordinates work efforts via a set of management tools built on top of sophisticated E-mail. The package follows work commitments to prevent items from falling through the cracks; although its nagging may rub many people the wrong way, the program can produce tangible rewards.

Coordination Technology, a well-heeled start-up in Trumbull, Connecticut, is busy on an even more ambitious project. This package, as yet unnamed, will support and then orchestrate many of the dozens or even hundreds of tasks that individuals and work groups face at any given moment—rather than focusing on individual tasks (as do most work-group

packages) or emphasizing explicit commitments made about given tasks (à la *The Coordinator*).

Chief Technical Officer Anatol Holt explains that Coordination Technology's package springs from his work in "connection mechanics," which, he says, deals with "people working together in physically organized work environments." One key to the package's development is a structured view of fundamental types of human interactions.

The package lets users organize work into a number of electronic centers, one per major job function. A sales vice president, for example, might have one center for tracking sales, one for personnel, and so on. Within each center you'll find role assignments (such as *acceptor* for budget review), links to the appropriate work group, and software tools (including standard applications such as *1-2-3*). Coordination Technology aims for maximum flexibility. "The goal is letting you, the user, build the environment," says Holt, with the network providing the connections. The prototype runs in DOS. A commercial edition requiring OS/2 with the Presentation Manager will appear next year.

Building Blocks of Work-Group Productivity

- Scheduling (maintaining appointment and meeting lists, and allocating resources)
- Document processing (creating, editing, tracking, distributing, and archiving memos, reports, and other materials)
- Bulletin boards (facilities for holding ad hoc group discussions and for broadcasting information to the entire work group)
- Time/Project management (maintaining individual and group to-do lists, and tracking work in progress)
- Computer conferencing (controlling and tracking formal group discussions)
- Work flow coordination (coordinating and tracking tasks that require more than one work-group member)
- Electronic mail (sending messages and formatted files to individuals or groups)
- Data base management (storing, categorizing, and retrieving information, including electronic mail messages)

Work-group productivity software builds on a foundation that combines electronic mail and data base management services. Most packages branch out to include one or more of the functions described.

REAL-TIMELY MEETINGS

Data General strives for another lofty goal: supporting "live" electronic meetings. Chris Stone, manager of the company's Office Systems Group in Westboro, Massachusetts, says a likely use for its prototype *Windows*-based application would be several people reviewing a budget at once. "The same document appears on everyone's PC at the same time, and simultaneously you can talk over the phone." The meeting leader controls participants' degree of access; each person can manipulate the screen by mouse and annotate voice comments.

What will make or break the software, Stone says, is its speed of response and its flexibility—including its ability to accommodate arguments, when those crop up. Still, early testing of the package, which currently has no release schedule, shows that many users prefer to meet in the flesh. Another constraint: "From a performance perspective, you really should have a net," Stone says. That point of view, obviously, excludes remote sites where the computer connection would be most valuable.

Jeff Raikes, Microsoft's director of applications marketing, also sees potential for electronic meetings that reach out to remote sites. "Ideally, your presentation software would be very interactive," he says; each user could look at other pieces of supporting data (like the actual numbers that generated a chart). Moreover, you could record the meeting for absentees, he suggests.

Diamond, a UNIX document-exchange application from BBN Systems and Technologies in Cambridge, Massachusetts, already offers just that. The package, which runs on Sun Microsystems' 386i, handles remote multimedia conferencing with integrated text, graphics, spreadsheets, charts, and voice annotation. Users can record meetings, and the program runs acceptably fast at 9600 bps, BBN claims.

SLOW-BURNING BARRIERS

Group productivity applications represent a real marketing challenge, according to Lotus's Manzi. The need for long customer courtships leads to early product announcements. And a suitable distribution channel doesn't exist; today's net resellers focus much more on communications expertise than on customer application needs.

Christopher Greendale, president of Network Technologies International in Ann Arbor, Michigan, acknowledges that his firm has encountered a rocky road with its UNIX-based *docuFORUM* document collaboration software. Greendale identifies three stumbling blocks: selling the concept, finding the right fit in the computing environment, and shaping software to fit specific jobs.

How will customers measure productivity gains, and how will they get employees to sign on? "The products that do best will be those that can be grasped quickly," predicts Lifetree's Wilson. "That's far more important than anything else."

According to Jeffrey Tarter, publisher of the *Soft-letter* newsletter in Cambridge, Massachusetts, it's just as important to come up with complete solutions. Tarter points to *ForComment* from Brøderbund Software in San Rafael, California, as an example of a product that supplies only a partial solution. "*ForComment* automated one-tenth of the [document processing] problem, when you have to automate the whole thing."

As Microsoft's Raikes remarks, "Vendors have to think through the scenarios for people who will be using their work-group tools, and then enhance their spreadsheets, word processors, and so on." At the same time, the software needs more than a nodding acquaintance with nonelectronic matters, including documents.

Pricing hasn't yet settled for all categories; listings for DOS products generally range between $100 and $200 per user. The industrial-strength OS/2 contenders haven't arrived, but clearly the overall environment will not be cheap. 3Com's OS/2 network system software, for instance, starts at $3000 and demands powerful 80286 and 80386 machines. Even more alarming, a few vendors are already talking wistfully about Intel's forthcoming 80486 chip.

THE ORGANIZATIONAL MANDATE

Mundane functions like scheduling can offer appreciable assistance in handling resources like conference rooms and audiovisual equipment. Payoffs can increase with large networks. For example, on a Banyan Systems wide area net, Trellis's *TimeTalk* can schedule fleets of cars at various sites and describe each car.

But add personal schedules to the equation, and it may no longer balance. Do you want all your co-workers to know your exact schedule? wonders Carol Woolfe, applications manager at Banyan in Westboro, Massachusetts.

Thriving on open information exchange, on-line conferences may yield some ancillary benefits, such as doing away with the powers of oratory and putting the focus on substance. New York group-productivity evangelist Esther Dyson claims that such systems "expose the hand wavers—everybody's argument looks plausible or implausible depending on the argument, not who said it."

"[Electronically linked] work groups are going to take a lot of personnel management," predicts Woolfe. "This is a new way of doing business—you're not just replacing a calculator with *1-2-3*—and it's scary stuff."

Achieving user friendliness "gets more intricate as the application gets more intricate," Woolfe adds, and clearly many offerings are confronting that dilemma. (Coordination Technology's prototype labels *1-2-3* an "encapsulated foreign object.") And with what conflicting interfaces should the software comply?

But despite all the hype, delays, and risks, users should watch for these packages. "A *VisiCalc* of networking is inevitable," declares Dave Williams, Banyan's director of product planning. And he stresses that such offerings will fortify not just work groups but entire companies. "As the network snakes through the organization, it becomes a nervous system that ties the organization together."

Eric Bender is PC World's *East Coast editor.*

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OS/2 EXTENDS ITS REACH

To stay in business in the 1990s, PCs will need to make connections. OS/2 Extended Edition will help them become upwardly mobile.

Eric Bender

If you upgrade from IBM's OS/2 Standard Edition to the new Extended Edition, does the operating system look different? No, because it's identical—"Extended" refers to added communications and data base management applications that IBM believes essential to any well-connected workstation.

IBM projects that by 1992, around 95 percent of all business PCs will be connected to their peers or larger systems. That scenario seems to call for a broad suite of connectivity choices, with corresponding data base underpinnings. "The disciplines of communications and data base management are becoming heavily dependent on each other," explains Tony Dvorak, manager of Extended Edition product operations at IBM's Entry Systems Division programming center in Austin, Texas.

With Extended Edition, IBM aims "to make a very advanced application platform that's very simple for application programmers," Dvorak says. The software also has to fit within IBM's imposing Systems Application Architecture (SAA) scheme, which calls for common application programming interfaces, user access methods, and communications options across IBM's major mainframes, minis, and micros.

The project called for massive in-house development, so IBM wrote Extended without the help of Microsoft. Does that make it a closed architecture? Not really. IBM is releasing specifications and tools much the way it has done with DOS. Communications vendors will compete no more directly with IBM than before. Data base suppliers can choose among platforms from IBM, Microsoft/Ashton-Tate, and others.

Customers saw IBM's first tangible results when Extended 1.0, which is character-based like Standard 1.0, arrived in August. Extended 1.1 will be available in November and will add Standard 1.1's Presentation Manager interface, although that won't be incorporated into the communications and data base management programs. Each version of Extended costs $795, with a free upgrade from 1.0 to 1.1.

Machine requirements are hefty. IBM says that you can get by with 3MB of memory and a 20MB hard disk, but if you take advantage of Extended's communications and data base functions, you will probably need at least 5MB of memory and a hard disk several times larger.

COMMUNICATIONS: THE VEGEMATIC MODEL

Corporate customers search for simple but effective ways to blend together applications and data files stored in their various types of machines. Extended's communications manager aims to support the PC end of that process.

Extended offers optional terminal emulation and file transfer for IBM 3101 and DEC VT 100 asynchronous terminals, and local (Dis-

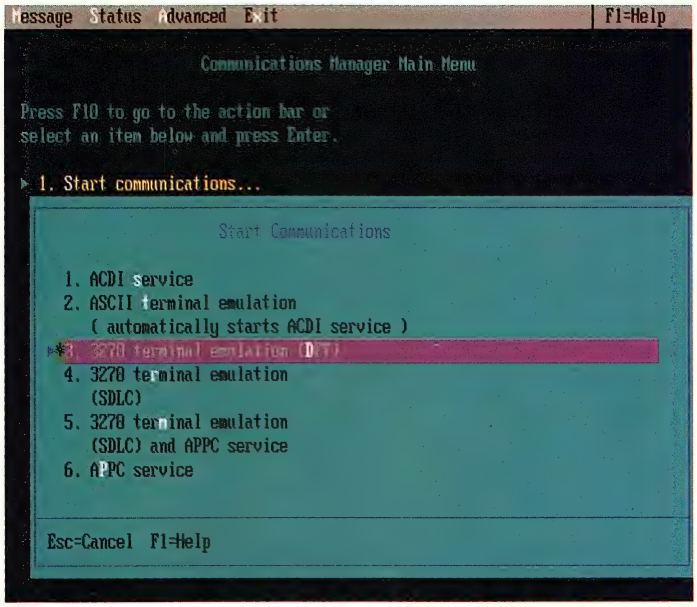
BRIAN CRONIN

tributed Functions Terminal) and remote (Synchronous Data Link Control) 3270 synchronous devices. But Extended provides only bare-bones functionality—less than that found in DOS equivalents. The software does raise the ceiling on mixed and multiple communications sessions, though, including up to five DFT and five SDLC sessions. Every Extended PC also gets communications management tools for nets of all sizes—including hooks for managing large computer networks.

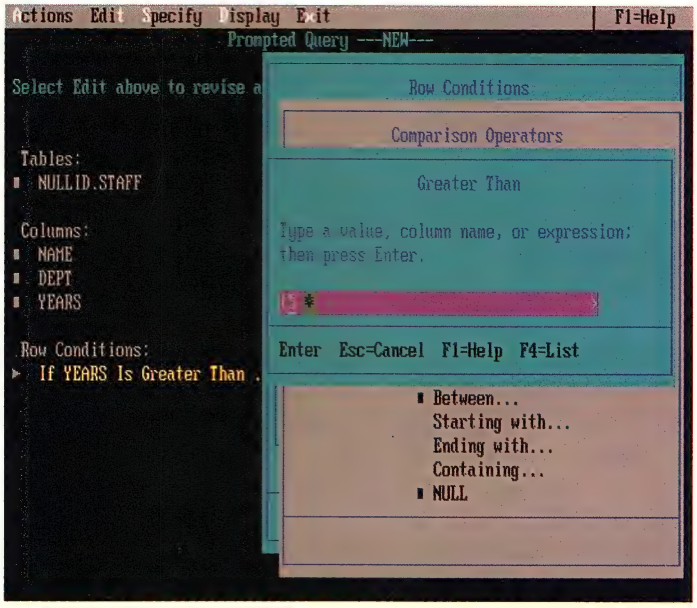
For the moment, users with most third-party peripherals (including Digital Communications' popular IRMA boards) are out of luck. Extended can't reach them, and IBM hasn't revealed any plans to change that.

This fall Extended 1.1 will hook up with Token-Ring and PC Network nets via IBM's *OS/2 LAN Server* software. At a future date, IBM will support the high-level 3270 programming interface, X.25 data networks, a systems network architecture local area network gateway, and emulation of the 5250 terminals that connect to System 3*x* and AS/400 minicomputers.

In general, IBM's rivals say they'll be the first to move most of the communications functions away from the PC and into a local area net server.



Extended Edition's communications manager is designed to let PCs juggle several different types of connections at once.



Users can access the data base manager's SQL engine through a bare-bones query manager; here a prompted query is underway.

ONE STORY, ONE SQL

Little brother to IBM's *DB2* relational system, Extended's data base manager is a single-user package. It divides into two components: A Structured Query Language (SQL) engine offers low-level data management functions, and a query manager provides both developer and end-user tools. Users can work from a command line or rely on menu-driven prompts that facilitate data entry, edits, queries, and report generation and even help you build custom interfaces. As with most relational data bases, the standard prompts are not overwhelmingly intuitive.

Single-user applications that respect SQL calls need

Upgrade Plans for OS/2 Extended Edition

	Extended Edition 1.0	Extended Edition 1.1	Extended Edition planned
Includes	OS/2 Standard Edition 1.0	OS/2 Standard Edition 1.1	OS/2 Standard Edition 1.1 or later version
Communications			
Multiple asynchronous	Y	Y	Y
3270 DFT, SDLC	Y	Y	Y
Token-Ring network	N	Y	Y
PC Network	N	Y	Y
SNA network gateway	N	N	Y
X.25 support	N	N	Y
5250 emulation	N	N	Y
Data base			
Single-user relational	Y	Y	Y
Network multiuser	N	N	Y
Minimum memory	3MB	3MB	n/a
Minimum storage requirement	20MB	20MB	n/a

OS/2 Extended Edition 1.0 offers relatively limited communications and data base modules. Version 1.1 will incorporate the Presentation Manager and support for files exceeding 32MB, plus connections for IBM local area networks.

not be rewritten for future multiuser offerings. Those offerings will include a data server for OS/2 networks, although Big Blue has not specified when such a product would appear.

Years from now, users will reach the higher altitudes of SAA where they won't have to worry whether data is on a PC in the office, a mainframe in Chicago, or a mini in Minneapolis. "Distributing SQL requests from a given task to multiple systems—PS/2s, System/370s, or AS/400s—is our goal," Dvorak says. "That's a difficult problem."

For more basic data base chores, Extended already offers the building blocks. The leading PC data managers are being recast to handle SQL, and those should sit comfortably on top of Extended's data base engine.

CHECKING THE COMPETITION

How does Extended stack up against its adversaries?

On the hardware side, Extended does not demand a PS/2. It runs—slowly—on an AT. It also works on Compaq Deskpros and other highly compatible PCs, minimizing any threat to those vendors. But IBM calls the Extended Edition one of the first packages that tunes into the PS/2's Micro Channel Architecture.

The Micro Channel supplies a broader bandwidth than the normal 10-MHz AT bus and more rugged performance for multiple communications links. While an AT can handle several 3270 sessions, for example, such hardware was not intended to play referee while concurrent sessions wrestle for the communications ports. Designed to share such interrupts, the Micro Channel lets PS/2 owners juggle more—and more varied—sessions. During the next decade, that may prove important to significant numbers of buyers.

In the software market, confusion reigns, partly because so many interlocking pieces will go into complete installations.

At the LAN level, the emerging Extended family primarily faces off against Microsoft, Novell, and their respective allies. But it's too early to handicap the race. Nobody's close to shipping complete kits. Look at data bases, now splitting into front ends and servers: The Microsoft/Ashton-Tate *SQL/Server* will butt heads with an unannounced Extended server, while an upgrade of Extended's query manager will duel with an unannounced Microsoft front-end package, among others.

Even though competitors may often surpass Extended's features, the software will become a de facto standard among the large corporate customers where IBM rules. And in that environment, it will extend our definition of a minimum workstation.

Eric Bender is PC World's *East Coast editor.*

FOR MORE INFORMATION

OS/2 Extended Edition 1.0, 1.1
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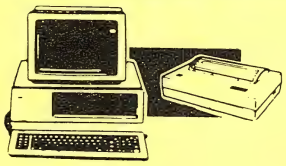

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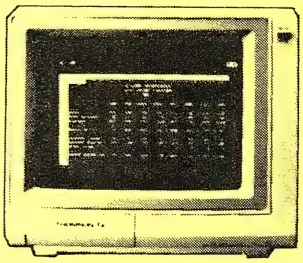

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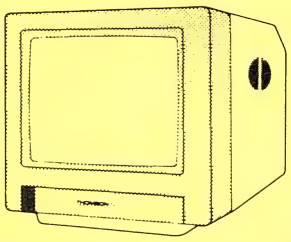

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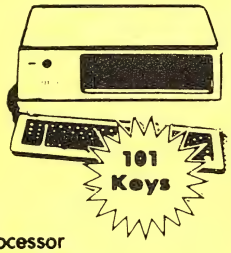

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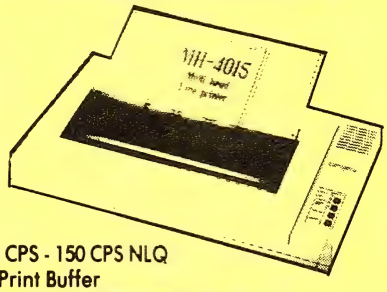

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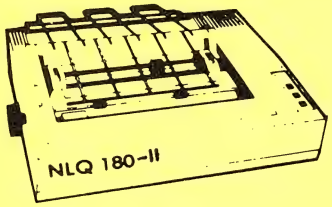

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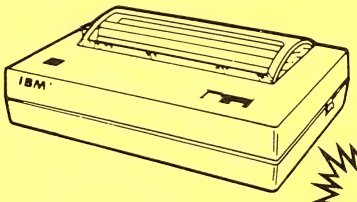

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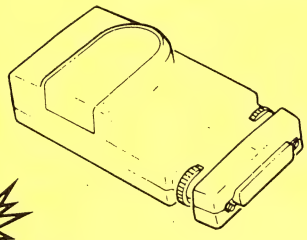

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ACCOUNTING TOOLS OF THE TRADES

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Industry-specific accounting systems can be the best solution for businesses with special needs. PC World surveys top products in three domains: point-of-sale, construction, and medical practice.

Off-the-shelf accounting packages aren't for everybody, but few companies can afford to code their own accounting systems from scratch. Fortunately, there is a middle ground: industry-specific or "vertical market" accounting packages tailored to your type of business. Of course, such systems aren't cheap. One thousand dollars typically buys a specialized module and perhaps some general accounting functions such as inventory or accounts receivable; a complete multiuser turnkey hardware/software system with a lot of on-site hand-holding can easily top $30,000.

Still, vertical market developers offer some things most *DacEasy* or *Solomon III* dealers can't—namely, familiarity with your industry's accounting cycles and vocabulary, plus comprehensive training and support. And there's another bonus: Since a vertical accounting package speaks your language, it's often easier to learn and use than all-purpose general accounting programs.

Careful shopping is still the watchword, because what you get depends on the source. Value-added resellers (VARs) often bundle the software with hardware—from PCs to bar-code readers to sales-slip printers. Other VARs (and vendors) include general ledger, accounts receivable, and accounts payable functions with the specialty modules, while still others offer packages that merely work with popular off-the-shelf accounting programs.

Dazzled by all this diversity? Trade organizations and industry-specific groups can be a valuable resource for prospective buyers; some publish reviews of accounting software or keep lists of recommended products. *PC World*'s survey of 18 vendors offering specialized retail, construction, and medical market accounting systems should get you off to a good start. Peruse the product descriptions, contact likely vendors for details and demos, and you'll be well on your way to making a sound business decision.

POINT-OF-SALE RETAIL

Point-of-sale (POS) software captures transactions; stores pricing data; and works with inventory, general ledger, and other "back office" accounting programs. A PC/cash-drawer combination typically records transactions at the front counter; dedicated digital cash registers (including those with programmable keypads) are the exception.

Naturally, you should look for a POS package that works with your registers and can reprogram them. If a PC is at the front counter, the program should allow on-line access to inventory and credit information. The POS package should also handle all standard retail functions from "no sale" to split-tendered (part cash, part credit) transactions; accept input from bar-code readers; and provide a simple tickler-file interface to inventory data. Look, too, for security features that protect against employees tapping the till.

Larger retailers should consider how POS data feeds into a sales-reporting module, as well as the system's ability to address multiple cash drawers and track inventory stored in a number of locations.

Mainstreet Merchandiser

Armor Systems

Mainstreet Merchandiser consists of POS, inventory control, accounts receivable, and customer data base modules. It supports input devices such as bar-code readers and programmable keypads. Support for wholesale operations—such as picking tickets—is included, and it can handle serialized inventory. One nicety: The program allows you to print a price quote for requested or out-of-stock items, then retrieve it later for an invoice. The package produces reports on lost sales and customer buying histories. Limited custom report formatting is available.

ARCS, Advantage

DataSym

DataSym offers a generic, single-store POS system called *ARCS* and a five-store system called *Advantage*, plus a variety of customized products that address special niches like theaters, restaurants, liquor stores, and apparel stores. *ARCS* utilizes cash registers (not PCs) as POS devices, and supplies PC interface boards for Sharp registers and PROM chips that reprogram keypads. The program produces reports on profit margin by item and fast, slow, and zero inventory movement. Separate modules handle general accounting functions such as inventory and invoicing.

Key Retailer

SoftKey Software Products

SoftKey's *Key Retailer* is unusual in that POS, inventory, general ledger, accounts receivable, accounts payable, and purchase order modules are bundled into a complete accounting system. Though originally designed for small-to-medium operations, the product today is used by some chains. It supports bar-code readers, up to 200 registers on a network, split tendering, multiple price levels, and serialized inventory. It does not, however, store and retrieve price quotes or support programmable keypads. The system time-stamps transactions and generates reports analyzing peak sales periods and serialized goods broken down by location or by customer.

Retail Management System

Westech Corp.

The *Retail Management System* concentrates on POS operating, inventory control, and customer data base management for individual stores; for general accounting functions, you must turn to the Star, Boss, or Certiflex product lines. A separately priced $244 mailing-list program allows a cashier to pull customer addresses from a data base and patch them into invoices. The inventory value report includes some rudimentary graphics that can highlight undesirable inventory buildups.

ILLUSTRATIONS BY MAX SEABAUGH

PC Register, Store Front Retailing, Branch Store Retailing
Trac Line Software

Trac Line has a system for almost any size retail operation, and all work with the vendor's full-function *Integrated Accounting* program. *PC Register*, an entry-level package, requires extra software and a modem to link to the accounting program. The more capable *Store Front Retailing* supports two registers and adds some inventory, purchasing, and accounts receivable functions. Aimed at small chains, *Branch Store Retailing* handles several registers within an individual store and can track and maintain inventory at multiple locations. An on-line querying feature allows the salesperson to pull up historical detail to help sell add-on products and respond to customer questions.

StoreMinder, InStore
Xtrasoft

StoreMinder is not a product itself but an umbrella trade name for a series of stand-alone modules: *SalesMinder* (POS), *StockMinder* (inventory), and *MailMinder* (customer data base). *InStore*, the flagship of a separate product line, combines POS and inventory functions for large chains, supports file and record locking, and can handle up to 26 registers on a network. Both *StoreMinder* and *InStore* support bar-code readers and programmable keypads, print full invoices or sales slips, and handle split tendering. A reorder report and multilevel pricing on the inventory status report are included. Xtrasoft products work with DASI's full-function accounting software.

CONSTRUCTION

The construction industry embraces everything from small companies putting up eight houses a year, to general contractors building apartment complexes, to large firms fulfilling major government contracts. Yet all construction accounting software is built around a job-cost module. Some vendors provide estimating and bid-analysis modules; if you win the bid, you use the bid data to set up the job-cost file. Most estimating modules allow you to "take off" quantities for pricing. Unless otherwise noted, you can assume the following packages include fixed-contract and time-and-materials billing; the estimating modules (if offered) are integrated with the job-cost module. Payroll support varies; the high-end systems handle numerous pay rates and multiple job sites across several states within a pay period, and produce certified reports for the Department of Labor. In general, systems designed for larger construction firms include more reporting because of government regulations.

Construction Management, Construction Accounting
Small Systems Design

Approved by the National Association of Home Builders (NAHB), this series includes complete job-cost and accounting functions for general contractors who work on a variety of projects. The *Construction Management* package maintains a complete bid history and features point-and-shoot selection of menu items as well as automatic job-file updating. Job reporting is very flexible—you can select items individually, in ranges, or all at once by date, vendor, job, and many other parameters. Templates automate job setup, and you can query the system via pop-up windows. There's even a project scheduler that features bar-graph and critical-path reports. The company's *Construction Accounting* package includes job-cost, general ledger, accounts receivable, accounts payable, and payroll modules, plus some estimating capability, but it lacks many of *Construction Management*'s advanced features. The company sells inventory and job-cost estimating modules, a special edition of its construction software for electrical contractors, and a service-bureau version which maintains data for several companies.

Series 2000
Concord Management Systems

Series 2000 is a multimodule package that offers large-scale builders a comprehensive and powerful accounting and construction management system. The job-cost data base is flexible, the payroll module well equipped for governmental reporting, and the query tools geared for decision support. Other high-end features include the ability to handle retainages, digitized takeoffs, and service orders. The program generates an executive summary highlighting gross and net profit by job, and it can print AIA-format draw requests on standard G703 forms.

Libra Construction Software

Libra Corporation

Libra is popular with some Big Eight accounting firms because it combines strong general accounting and construction functions. Designed for companies managing several projects at once, *Libra*'s job-file data base allows you to define data fields and track jobs by estimator, project manager, or foreman. The program also tracks equipment use. Libra markets an estimating module that integrates with the job-cost module and supports digitized takeoffs. The system can also create custom reports. Libra also offers specialized submodules from laser check printing ($995) to sales analysis and billing ($200).

Medallion, Precision

Timberline Software

Timberline offers three different selections from its line of modules: *Medallion/Builder* for home-builders; *Medallion/General* for general contractors; and *Medallion/Specialty* for plumbing, heating, or electrical contract work. All three modules can track multiple companies, and all three come in multiuser versions. You can produce detailed per-unit cost reports, bonding reports, and phase graphs to aid in scheduling subcontractors. The company also offers a separate estimating module. Timberline's *Precision* series provides estimating and bid analysis functions that work with the job-cost module; the package supports digitized takeoffs and uses pop-up windows.

Basic Builder, Profit Builder

Construction Data Control

Basic Builder is a simple, single-user, single-company system that bundles job-cost, general ledger, accounts receivable, and accounts payable modules into a $1695 package.

WARRANTY AND SUPPORT

Vendor	Money-back guarantee (days)	Network version available	Free phone support (days)	Extended support cost/ module	On-site install/ training	Import/ export data type[1]
POINT-OF-SALE RETAIL						
Armor Systems		yes	30	$200/yr.	no	2,3,4
DataSym	30	yes	30	5	yes	4
SoftKey Software		yes	5	5	yes	4
Trac Line Software	5	yes	6	$875/yr.[7]	yes	4
Westech	90	yes	90	$200/yr.	no	2
Xtrasoft		yes	5	$100–$350/yr.	yes	2,3,4
CONSTRUCTION						
Concord Management Systems		no	90	$125–$350/yr.	yes	2
Construction Data Control		yes	90	$75–$150/yr.	yes	2,4
Enterprise Computer Systems	90	yes	365	$100–$600/yr.	no	2
LIBRA		yes	60	$125/hr.	yes	3,4
Small Systems Design		yes	365	$795/yr.[7]	yes	4
Timberline Software	90	yes	90	$50–$100/yr.	yes	2,4
MEDICAL						
American Medical Software		yes	90	$150–$250/yr.	yes	4
Artificial Intelligence		yes	45	$500/yr.	yes	4
Data Strategies		yes	365	$480/yr.	yes	4
Elcomp Systems		yes	90	8	yes	4
Physician's Practice Management	30	yes	30	$1000/yr.	yes	9
PSM	90	yes	90	$130/hr.	yes	2,3,4

1 May be offered via extra module.
2 Exports files in 1-2-3 .WKS and .WK1 formats.
3 Exports files in dBASE .DBF format.
4 Exports files in ASCII format.
5 Supplied by VARs; arrangements vary.
6 Trac Line offers 30 minutes of free support during the first 30 days of purchase.
7 Price for all modules.
8 Support costs based on a percentage of module's purchase price.
9 Only with PC*Claim.

(Estimating and payroll modules are extra.) The job status report shows projected cost variances and can detail costs by category or summarize them by class. *Profit Builder* is a multicompany, networkable series that you buy module by module. A *Basic Builder* user can receive credit toward a *Profit Builder* upgrade and obtain a conversion utility that moves data from one system into the other. Both product lines feature point-and-shoot operations, macros, and queries via pop-up windows. The estimating modules support digitized takeoffs, but neither system handles time-and-materials billing.

Business Management System, Professional Estimating
Enterprise Computer Systems

Highly rated by the NAHB for ease of use and overall customer satisfaction, Enterprise's products are aimed at small and medium-size home builders. Along with its general accounting functions, the *Business Management System* includes documentation aimed at newcomers to PC-based accounting, an on-disk tutorial, and extensive sample data. The job-cost module produces up to 96 distinct reports and offers formats for different types of building. *Professional Estimating* comes with a 10,000-part data base and applies a systematic approach to pricing jobs.

MEDICAL

Since many patients pay for medical services via third-party insurance carriers, billing is the most pressing accounting problem facing doctors, medical corporations, and clinics. More than other specialized programs, medical market software attempts to provide "total solutions," offering the basic accounting modules and necessary hardware for one (usually expensive) package price. In addition to billing and accounting, some packages offer modules for scheduling appointments and making follow-up phone calls to patients; some even maintain clinical information on patients. Reporting can also be rather sophisticated, detailing contact lenses sold by month or comparing each doctor's financial performance over time.

Flexible Package
Elcomp Systems

Highly adaptable to individual needs, this package comprises a "medical core" module that handles patient registration, accounts receivable, and budgeting. Optional modules take care of general accounting, electronic claims, insurance forms design, patient recalls, appointment scheduling, and medical records. Most modules offer both family-practice and specialty-practice billing. The system can report on overdue insurance claims and produce 14-month financial trend reports.

CompuMedic
Data Strategies

CompuMedic consists of accounts receivable, insurance processing, patient records, recalls, general ledger, word processing, a powerful report writer, and a tie-in to General Electric's on-line medical claims clearinghouse. Additional options include accounts payable, patient scheduling, inventory, and electronic medicare claims submission. You can also design custom reports with the system.

Medical Office Billing System, Medical Office Management System
American Medical Software

The *Office Billing System* takes care of billing, accounts receivable, and insurance claims processing. The *Office Management System* handles appointment scheduling; generates revenue analysis reports by practice (according to diagnosis, location, physician, or procedure), plus other diagnosis and procedure history reports; and offers a word processing interface. An electronic claims module is also available.

TIPS Healthcare Management System
PSM

PSM's package comes in basic and advanced versions. At a minimum you get accounts receivable, insurance processing, patient recalls (with batch printing of postcards), and general accounting. The advanced package adds electronic claims, clinical and lab test reports, surgical scheduling, hospital census, and more sophisticated revenue reports. *TIPS'* statistical reports can select patient records by age, sex, procedure, and many other criteria.

PAS-3 Plus Medical
Artificial Intelligence

The basic *PAS-3* package includes patient registration, accounts receivable and billing, mailing lists, and a custom insurance-forms generator. The program offers eight billing modes, pop-up windows, continuous background data-integrity checking, a pause key that temporarily suspends operations, and a relational query feature for generating custom reports from the transaction data base. The company also sells a medical records module, general ledger (payroll included) and appointment scheduling modules from another vendor, and various specialized modules for dentists, anesthesiologists, and chiropractors.

Threshold, PC*Claim
Physician's Practice Management

Threshold is a basic insurance processing package aimed at smaller practices. The system includes accounts receivable, patient regis-

tration, billing, and paper-claims processing, but only limited reporting. Option packs priced from $305 to $615 let you schedule appointments and generate clinical and financial reports. *PC*Claim* focuses on electronic insurance claims processing. The company does not offer general ledger, accounts payable, or payroll modules.

Ralph Soucie is a CPA in Portland, Oregon, and a contributing editor for PC World.

WHERE TO BUY

POINT-OF-SALE RETAIL

Armor Systems, Inc.
324 N. Orlando Ave.
Maitland, FL 32751
407/629-0753
List price: Mainstreet Merchandiser $2480, General Ledger $695, Accounts Payable $695, Purchase Order $695, Payroll $695
Reader service no. 610

DataSym
435 Elgin St.
Brantford, Ontario
N3T 5Y6 Canada
519/758-5800
List price: ARCS $2495; Advantage $5995; Inventory Control $1495; Accounts Receivable, Payable, General Ledger, and Invoicing $1495
Reader service no. 611

SoftKey Software Products, Inc.
260 Richmond St. #300
Toronto, Ontario
M5V IW5 Canada
800/263-5800
List price: Key Retailer $2295
Reader service no. 612

Trac Line Software
51 Alpha Plaza
Hicksville, NY 11801
516/935-7500
List price: PC Register $279, Store Front Retailing $795, Branch Store Retailing $1095, Integrated Accounting $2495, Purchase Order $495
Reader service no. 613

Westech Corp.
P.O. Box 432
Sparta, NJ 07871
201/729-4378
List price: Retail Management System $649, Mountain Mail $244
Reader service no. 614

Xtrasoft, Inc.
4701 Patrick Henry Dr. #2101
Santa Clara, CA
408/986-9872
List price: StoreMinder series: SalesMinder $995, StockMinder $995, MailMinder $395. InStore series: InStore $2995 for one to three workstations (extra for additional workstations); Customer Link (data base and list manager) $595
Reader service no. 615

CONSTRUCTION

Concord Management Systems, Inc.
5301 W. Cypress
P.O. Box 25617
Tampa, FL 33622
813/875-4492
List price: Series 2000 run-time module $200, Job Cost $2500, Subcontractor Control $900, General Ledger $1500, Payroll $1500, Purchase Order $900, Accounts Receivable and Billing $1500, Accounts Payable $1500, Scheduling $2995
Reader service no. 616

Construction Data Control
3675 Crestwood Pkwy.
Atlanta, GA 30136
800/221-3929
Basic Builder $1695, Payroll $600, Estimating $695. Profit Builder: Job Cost $1500, General Ledger $1500, Standard Payroll $1500, Variable Rate Payroll $2500, Purchase Order $1500, Accounts Receivable $1500, Accounts Payable $1500, Subcontract Control $795, Profit Bid Estimating $3495
Reader service no. 617

Enterprise Computer Systems, Inc.
One Independence Pointe
Greenville, SC 29602
803/234-7676
List price: Business Management System $4995, Professional Estimating $3995, Accounts Receivable $1595, Payroll $1595
Reader service no. 618

Libra Corp.
1954 East 7000 S
Salt Lake City, UT 84121
800/453-3827
List price: Libra Construction Software: Job Cost $1295, General Ledger $795, Payroll $795, Order Entry $1295, Accounts Receivable $795, Accounts Payable $795, Inventory Control $795, Espri Advanced Estimating $2995; required Libra Environment $195
Reader service no. 619

Small Systems Design
4894 Sterling Dr.
Boulder, CO 80301
800/272-0053
List price: Construction Management $6995, Construction Accounting $2995, Job-Cost Estimating $1995, Inventory $995
Reader service no. 620

Timberline Software
P.O. Box 728
Beaverton, OR 97075
503/644-8155
List price: Medallion series: Medallion/Builder (single user) $5530, (multiuser) $7670; Medallion/General (single user) $7455, (multiuser) $10,400; Medallion/Specialty (single user) $7250, (multiuser) $10,060; Job Cost $3160; General Ledger $1155; Payroll $1185; Accounts Receivable $1155; Inventory $1155; Accounts Payable $1155. Precision series: Estimating (single user) $840, (multiuser) $1195; Estimating Plus (single user) $2840, (multiuser) $3990; Digitizer (single user) $1990, (multiuser) $2850; Bid Analysis (single user) $990, (multiuser) $1395; Cut and Fill (single-user version only) $1495; Pricer (single user) $490, (multiuser) $690; Advanced Data Bases $1490
Reader service no. 621

MEDICAL

American Medical Software
20 Edwardsville Professional Park
Edwardsville, IL 62025
800/423-8836
List price: Medical Office Billing System $1495, Medical Office Management System $2495, Electronic Claims Submission $495
Reader service no. 622

Artificial Intelligence, Inc.
P.O. Box 569
Renton, WA 98057
206/271-8633
List price: PAS-3 Plus Medical $2995, Medical Records $500, Digital Software Gold General Ledger $595, Digital Software Sum:Time (appointment scheduling) $150
Reader service no. 623

Data Strategies, Inc.
17150 Via Del Campo #203
San Diego, CA 92127
619/451-0480
List price: Compu-Medic $5600, Accounts Payable $400, Appointment Scheduling $1200, Inventory $400
Reader service no. 624

Elcomp Systems, Inc.
Foster Plaza VII
661 Andersen Dr.
Pittsburgh, PA 15220
800/441-8386
List price: Flexible Package core module $500; Billing $1000; General Ledger, Accounts Payable, and Payroll $2400; Electronic Claims Submission $1875; Insurance Forms Designer $1000; Patient Scheduling $750; Patient Recalls $750; Medical Records $3125
Reader service no. 625

Physician's Practice Management, Inc.
350 E. New York St. #300
Indianapolis, IN 46204
317/634-8080
List price: Threshold $1995; Financial Pack (practice analysis) $615, Listing Pack (various reports) $595, Appointment Registration Pack $305, Manager Pack (more reports) $605, all four packs $1000. Prices slightly lower if extended support is purchased. PC*Claim modules vary from $89.95 to $549, depending on features desired.
Reader service no. 626

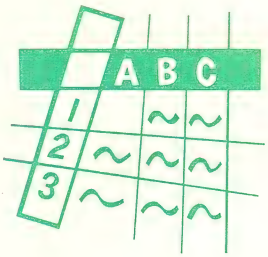
PSM, Inc.
P.O. Box 1877
Kettering, OH 45429
513/293-0692
List price: TIPS Healthcare Management System: basic version $3495, advanced version $5495, Appointment Scheduling $695
Reader service no. 627

For more information about any product, contact the manufacturer or circle the number on the reader service card.

How Hard Is Your Money Working?

Once you've put your money to work, how do you judge its performance?

The Du Pont Return-On-Investment chart gauges your venture's efficiency and shows you the arithmetic.



Spreadsheets

Charles Kyd

Contemplating an investment? Whether it's a single share of stock, a piece of production machinery, or an entire company, one of the most important questions you can ask is, What's the ROI? Though many other factors also bear consideration, the likely return on your investment marks the threshold between thumbs up and wait and see.

But the need for ROI calculations doesn't end once the investment is made. Just as the interest rate of a savings account reflects its ongoing performance, the ROI is a vital sign of business profitability.

Since the early 1920s, the Du Pont company has used an ROI formula chart similar to the one in **FIGURE 1** to measure its internal performance. Du Pont's formula is recognized worldwide as an effective financial management tool. This article describes how to create a Du Pont ROI chart in *Excel;* however, you can use any character-based spreadsheet and approximate the look of the *Excel* chart by using the underline and vertical bar characters.

The ROI chart in **FIGURE 1** illustrates how income and assets are combined to calculate a Return-On-Investment ratio. Notice that the Du Pont formula uses gross investment (assets before deduction of accumulated depreciation) to calculate this ratio, while many other companies use net investment. Either method will work as long as you use it consistently.

FIGURE 2, which contains a standard business income and assets statement, provides the numeric data for the ROI chart in **FIGURE 1**. The Income section shows a breakdown of income for the previous 12 months, often called a

rolling 12-month income statement. The Assets section comes from the balance sheet at the end of the period. Designing the ROI chart to reference standard financial worksheets like these streamlines maintenance and makes it easier to vary the formulas, if desired.

Creating the ROI Chart

To create **FIGURE 1**, first open a new worksheet and deselect *Gridlines* in the *Options Display* dialog box. Next, in the *Format* menu, assign the 8-point Helv font to the worksheet, then set the width of columns A and U to **3.33**; columns B, F, J, N, R, and T to **3**; columns C, G, K, O, and S to **8**; and columns D, E, H, I, L, M, P, and Q to **2**. There's also a quick way to format several non-adjacent columns (or cells): Go to the first column and press **< Shift > - < F8 >**, go to the next column and press **< Shift > - < F8 >** twice, go to the next column, and so on. Then set the desired format.

Enter the labels shown for cells K5 and K6 and assign the 10-point Helv Bold font to the range K5:S5. Enter the formula **=TEXT(DATE(88,11,1),"mm, yyyy")** into cell S5 to display the date as text; this allows the date to extend beyond the limits of column S without returning an overflow error as a value-format date would. To complete the date format, select *Format Alignment* and choose *Right*, which forces excess text to extend beyond the left border of cell S5.

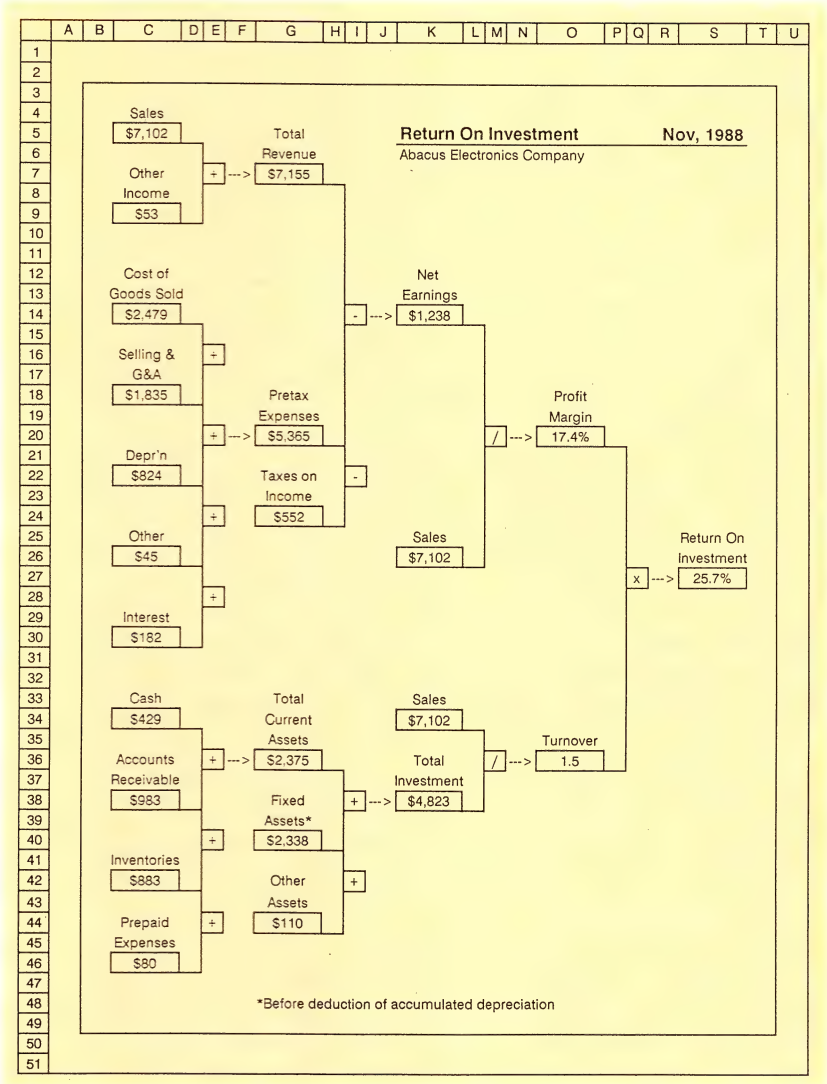


FIGURE 1: Standard income-statement and balance-sheet numbers plug into this Excel worksheet to calculate the Return On Investment.

The range C5:E9 contains a pattern of borders and symbols that you can copy to create the remainder of the chart quickly. To format cells C5, C9, and E7, select the *Format Border* menu and select *Outline*. Center-align the range using the *Format Alignment Center* command, and assign the numeric format to cells C5 and C9 from the *Format Number* menu. To draw connecting lines between cells, create top and right borders in the necessary cells in column D using *Format Border*.

Next, copy all or part of the range you've just created to the necessary locations (C14, C18, C22, and so on). Then enter the remaining labels and addition,

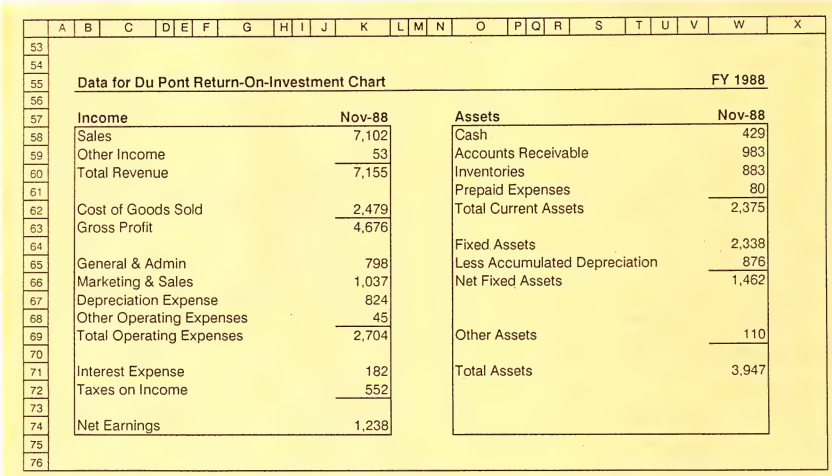
subtraction, multiplication, and division symbols. To create the arrow in cell F7, enter a space, four dashes, and a greater-than symbol.

Format cells O20 and S27 as percentages and cell O36 using one decimal place. Finally, to frame the entire chart, select the range B3:T49 and choose *Outline* from the *Format Border* menu.

FIGURE 2 is created within the same worksheet as **FIGURE 1** to make cell referencing easier. Starting in cell B55, type in all labels as shown and assign the numeric format to the ranges K58:K74 and W58:W74. Then, in cell K60 enter **=$K$58+$K$59**; in cell K63 enter **=$K$60−$K$62**; in cell K69 enter **=SUM($K$65:$K$68)**; in cell K74 enter **=$K$63−$K$69−$K$71−$K$72**; in cell W62 enter **=SUM($W$58:$W$61)**; in cell W66 enter **=$W$64−$W$65**; and in cell W71 enter **=$W$62+$W$66+$W$69**.

To reference the data in your chart, open a new window with *Window New Window* and turn off its gridlines. Then, arrange the windows side by side with *Windows Arrange All*. In one window, display the cells in the ROI chart that you want to fill; in the other window, display **FIGURE 2**, containing the data. You now have two views of the same worksheet. To fill the chart's first cell, Sales, select cell C5 in one window, enter =, select cell K58 in the other window, press the **<F4>** (Absolute/Relative) key to assign an absolute reference to the formula, and then press **<Enter>**.

Repeat this technique for cells C9 and K59, C14 and K62, and so on. In the case of cell C18 (Selling & G&A), you'll have to finish the reference formula by



Data for Du Pont Return-On-Investment Chart — FY 1988

Income	Nov-88
Sales	7,102
Other Income	53
Total Revenue	7,155
Cost of Goods Sold	2,479
Gross Profit	4,676
General & Admin	798
Marketing & Sales	1,037
Depreciation Expense	824
Other Operating Expenses	45
Total Operating Expenses	2,704
Interest Expense	182
Taxes on Income	552
Net Earnings	1,238

Assets	Nov-88
Cash	429
Accounts Receivable	983
Inventories	883
Prepaid Expenses	80
Total Current Assets	2,375
Fixed Assets	2,338
Less Accumulated Depreciation	876
Net Fixed Assets	1,462
Other Assets	110
Total Assets	3,947

FIGURE 2: The ROI chart in FIGURE 1 gets its information from this table. The same calculations are performed in both figures to catch errors.

typing in **$K$65+$K$66**, since those two cells are combined on the ROI chart. After you're done, press **<Ctrl>-<F4>** to close either window.

The last step is to enter formulas into the eight cells in **FIGURE 1** that do not directly reference data in **FIGURE 2**. In cell G7 (Total Revenue) enter **=$C$5+$C$9**; in cell G20 (Pretax Expenses) enter **=SUM($C$14:$C$30)**; in cell G36 (Total Current Assets) enter **=SUM($C$34:$C$46)**; in cell K14 (Net Earnings) enter **=$G$7−$G$20−$G$24**; in cell K38 (Total Investment) enter **=SUM($G$36:$G$44)**; in cell O20 (Profit Margin) enter **=$K$14/$K$26**; in cell O36 (Turnover) enter **=$K$34/$K$38**; and in cell S27 (Return On Investment) enter **=$O$20*$O$36**.

The formulas in cells G7, G36, and K14 perform calculations duplicated in cells K60, W62, and K74, respectively. However, repeating the calculations will help pinpoint any mistakes that might creep into a frequently edited income-and-assets statement; errors could slip by unnoticed if **FIGURE 2**'s subtotals were blindly linked to **FIGURE 1**'s.

Modifying the Du Pont Chart

Many financial analysts use variations of the Du Pont chart that you might want to create as well.

To generate the Return On Assets (rather than ROI) ratio, for example, link cell W66 (Net Fixed Assets) rather than cell W64 (Fixed Assets) to cell G40. Another variation calculates Return On Equity by adding a third ratio, consisting of net assets divided by stockholders' equity, to column O. Multiplying this new ratio by Turnover and Profit Margin returns the ROE. Another variation excludes interest expense and taxes from the calculation of expenses. This separates the effects of the business's internal operations from external tax and financing costs. Whichever variation you choose, the Du Pont formula is an invaluable tool for calculating profitability.

Charles Kyd, a writer and consultant in Seattle, spent ten years as a CFO. This article is adapted from his new book, The Microsoft Excel Business Sourcebook *(Microsoft Press, Redmond, Washington, 1988).*

PC MAGAZINE EDITOR'S CHOICE

Toshiba's 6.4 Pound T1000 Is the Lightest Laptop Yet

PC HANDS ON

BY HOWARD MARKS

Big advances have been made in DOS-compatible laptop computers in the last year. Back lighting and supertwist LCDs have made screens sharper than ever, miniaturized hard disks from JVC have expanded stor

with the programs on your desktop computer.

Toshiba America, which had a lot to do with this laptop revolution, is bucking the trend Its new T1000 sacrifices a few of the amenities we've come to expect from new laptops but delivers the essentials in a sturdy 6 4 pound package

There's no

But the T1000 is a case of less being more. The design is brilliant DOS is stowed on a ROM chip for instant booting. The 12¼- by 2 by 11 inch package fits in an ordinary briefcase It runs on a charge for 5 hours and can keep

bytes

light, portable computer.

A couple of pounds heavie than Tandy's Model 100, its fa more powerful

Of course, Toshiba was un der pressure to come up w

A tariff impo

LAN Magazine

A Major Technological Feat. There Is Nothing That Comes Close To The T1000.

By Harry Newton

This is another one of my biased test drives. I like this product. I use it. I am writing this test drive on it, sitting in bed. s is one gorgeous luxury.

1000 is the lightest PC-compatible

It's 6.4 pounds (in case

BYTE JANUARY 1988

THE MOST PORTABLE IBM PC-COMPATIBLE COMPUTER I'VE EVER USED.

The T1000 (see photo A) is a full IBM PC-compatible computer in a compact 6½-pound package. In its standard configuration, the T1000 comes with an 80C88 running at 47 MHz, 512K bytes of 100-ns RAM, MS version 2.11 in ROM, a single 720 inch floppy disk dr

PC WEEK

T-1000 Lap-Top: Light, but No Featherweight in Performance

By Stephen Sagman

To fashion the extraordinarily small T-1000 lap-top computer, Toshiba engineers took their best-selling T-1100+ lap-top, miniaturized everything they could and scrapped the frills

What they th is a feather-wei ittle bigger k to-

That Toshiba engineers gave overriding emphasis to keeping the T-1000's size and weight down is evident in every aspect of its design.

The T-1000 display is the same super-twist LCD panel used in the Toshiba T 1100+. It has the advantage of pr high-contrast text and gra drawing very little pow ng the batte

Before You Choose A Portable PC, Make Sure You Read The Fine Print.

When the experts reviewed our lightweight T1000, they did anything but take it lightly.

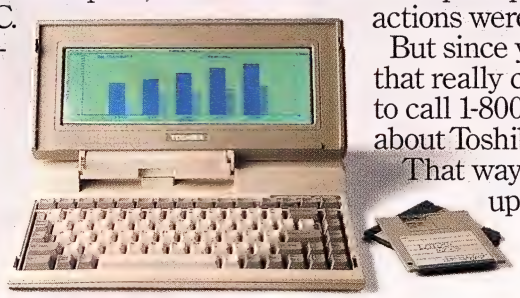
Because even though it weighs just 6.4 pounds and takes up less than a square foot of desk space, they found it has the power of a desktop PC.

So it's little wonder they were so impressed with everything we managed to fit inside. Like 512KB of RAM. A 720KB 3½" floppy drive. MS-DOS® 2.11 in ROM. And a full array of built-in interface ports.

Equally impressive is our optional 768Card, which can be configured as EMS memory or as a battery-backed RAM disk. With it, you can load your software onto the 768Card—which then acts like an invisible second drive—and get even faster access to all your programs.

All of which helps explain why the experts' reactions were so flattering.

But since your opinion is the only one that really counts, we encourage you to call 1-800-457-7777 to learn more about Toshiba computers and printers. That way you may very well come up with a few positive quotes of your own.



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CONSUMER WATCH

Advice and information for the computer consumer

"Pushed" PCs deliver fast performance at a low cost—but buying one could be risky.

Anita Amirrezvani

ANTHONY RUSSO

If you're looking for a fast PC, shop with caution. Advertised speed ratings can be misleading—and a PC's microprocessor could be less than it's cracked up to be.

A system advertised as a 25-MHz 386 may not actually contain an 80386-25 chip. This 25-MHz microprocessor—the fastest Intel makes—is not expected to be widely available until early 1989. In the meantime, smaller vendors who can't get the fastest chips are buying 20-MHz 80386s and "pushing" them beyond specification, to 24 MHz and sometimes further.

This speeding-up process unfolds in several stages. First, the manufacturer buys thousands of Intel chips and screens them, searching for chips that will run faster than specification. In the next stage, each screened chip is paired with a faster crystal, the part that regulates a microprocessor's speed. A crystal operating at a higher frequency makes the microprocessor perform faster—for example, at 25 MHz instead of 20 MHz. Other parts, such as memory chips, must also run faster for the system to work.

Intel Takes a Stand

According to Intel, it's risky to run a chip beyond its specification. "We test our parts to work right at the specified frequency under a series of conditions that include different voltages and operating temperatures," says Intel marketing director Claude Leglise. "When parts are used out of specification, the system could freeze, math results could be erroneous, and the parts could become overstressed and break. It doesn't always happen, but it's hard to predict when it will and when it won't."

"There are many ways to speed up your system that are easy and safe," adds Intel's Bill Rash, product marketing manager for 32-bit chips. "You can go out and buy an accelerator board, for example. With a speeded-up system you're crossing your fingers that you won't run into problems."

Even some manufacturers believe pushed PCs are risky. "Insidious problems can occur, like a wrong number appearing in a spreadsheet," says Ken Aupperle, president of motherboard maker Hauppauge Computer Works (which does not use pushed chips). "If I were buying one of those systems, I would make sure the vendor knew how to properly screen the parts. But outside of IBM or DEC, there aren't too many vendors whose word I would take."

The Other Side of the Coin

Manufacturers of speeded-up systems beg to differ. "There's a lot of politics in this. Intel doesn't want people to believe that its 16-MHz chips will run at 20 MHz because it wants to sell the 20s for a higher price," says

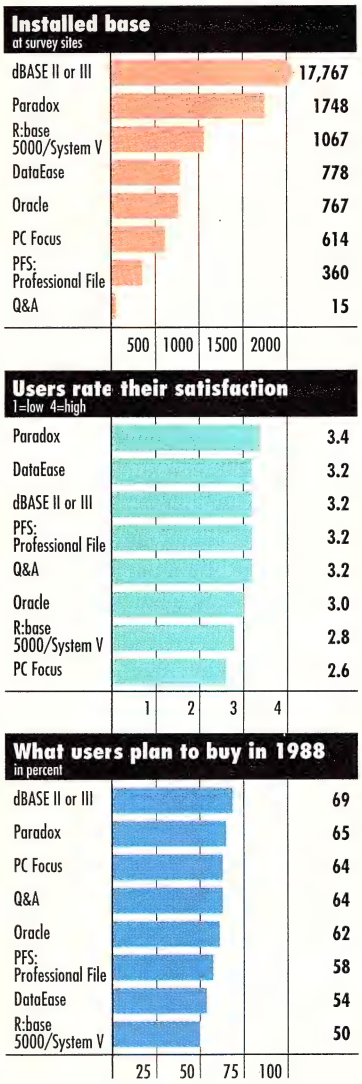
(continues)

RATE YOUR SATISFACTION: Data Bases

Market giant *dBASE* boasts a decent user satisfaction rating—but it's not as high as *Paradox*'s. Even so, more of the survey sites plan to buy *dBASE* than *Paradox* this year.

Although its installed base is large for a *dBASE* competitor, *R:base* received only an average user-satisfaction rating among survey participants and ranked at the bottom of the plan-to-buy list.

Flat-file upstart *Q&A* isn't widely distributed among survey sites, but it rated as highly as *dBASE* in user satisfaction. Not surprisingly, a healthy percentage of the companies say they plan to buy *Q&A*.



Source: International Data Corporation. From a survey conducted in February 1988 of 185 sites, each with at least 50 PCs.

Guy Duff, national sales manager for Dyna Computers in San Jose, California.

Dyna Computers currently sells a 24-MHz 386 system and motherboard and has been selling pushed 80286 systems for years. "Based on our previous experience, Intel chips are built well beyond specification," says Duff. After the chips have been screened, he says, every Dyna motherboard is burned in and tested in a "hot box" for 72 hours. According to Duff, "After six years of business, we haven't gotten a single dead CPU back from our customers."

Computer Classifieds, a vendor in Miami, also sells pushed 24-MHz systems—but doesn't drive the chip up to 25 MHz. "It takes much more testing to screen reliably beyond 24 MHz," says Marketing Vice President Charles Papir. "There's a happy medium between the amount of testing required and the final price."

For consumers, the advantage to buying a pushed PC is cost. Major manufacturers sell 25-MHz 80386s for top dollar—IBM's least expensive complete system, for example, retails for $8600. "You can get one of our 24-MHz systems for half that price," says Dyna Computers' Duff. Moreover, a speeded-up system may deliver a lot of performance without costing much more than a slower PC. Computer Classifieds' 24-MHz system sells for roughly $4300 with a monitor and hard disk—only about $400 more than its 20-MHz machine.

Even when 25-MHz chips are available to any manufacturer that wants them, systems will continue to be pushed—so long as there's a demand for better performance. Vendors estimate that the 80386-25, for example, can be speeded up to 32 MHz.

Zippy Coprocessors

Coprocessors can also be pushed to achieve faster speeds—and that's exactly what Ariel Computer in Flemington, New Jersey, is doing. "We test thousands of coprocessors every month," says Ariel vice president of engineering Jeff Lackman. "Most 10-MHz chips can qualify for 12, others make it to 14 or 16 and some even get up to 20 MHz. Originally our customers were mostly technical; now the mainstream is picking up because graphics and *Microsoft Windows* programs require a lot of processing power."

The fastest 80287 available from Intel is officially rated at 10 MHz. These chips can be purchased through mail order for about $319; chips pushed by Ariel to 12 MHz are $499, 14s are $599, and 16s are $699. "Large corporations say our product allows them to use PCs instead of minicomputers for big calculations," says Lackman.

Ariel also sells an $89.95 product called XCELX Speedinjector, a crystal you can install in your PC to speed up an existing 80287 to 16 MHz. A similar concept applies to turbocharging microprocessors: Vector Development sells a $125 product called AT TurboSwitch II that you can use to run a 6-MHz IBM AT (but not compatibles) at speeds of up to 12.5 MHz. But in both cases, the crystal is speeding up a chip that hasn't been screened or a system that hasn't been tested at higher levels of heat and stress. So you may get unpredictable results.

(continues)

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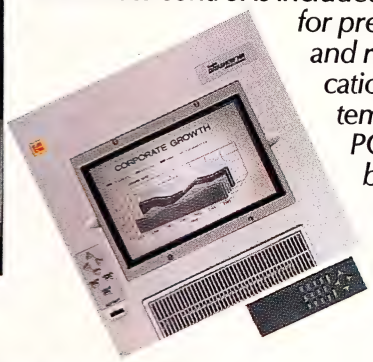

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Buying Tips for Systems

Before buying a PC, you have the right to know whether the system has been pushed or actually contains a microprocessor rated at the advertised speed. If there's any doubt, open it up and check the microprocessor yourself. Every Intel chip's spec is etched right on its outside cover.

Note, too, that faster machines generate more heat and may have more difficulty getting Class B approval from the Federal Communications Commission. Class B PCs are shielded more thoroughly than Class A machines and are cleared for residential use. The issue is possible interference: radio reception problems or "snow" on your TV while the PC is on.

According to FCC engineer Liliane Volcy, "The compliance rate with Class B regulations is very low. Many companies don't have the capital to invest in system design and testing, or they simply want to keep the computer's cost down." If the computer is going to be used at home, you should make sure it's rated Class B by the FCC.

If you want to buy a pushed system, find out first how rigorous the manufacturer's tests are. "If a company just puts in the chip, boots the computer, and then sends it off, that's not good," says Computer Classifieds' Papir.

Get any speed guarantees in writing, advises Ariel's Lackman. "I've seen this loophole: A system is supposed to run at 8, 10, 12, and 16 MHz, but when the user runs it at 16 MHz, it dies. The manufacturer says, 'Sorry, but to run it at 16 MHz you need a new chip.'"

Finally, find out about replacement policies. Companies that stand behind their products will be generous about fixing problems. "If your CPU dies, we'll send you a new one by overnight mail," says Dyna Computers' Duff. A guarantee like that inspires confidence.

FOR MORE INFORMATION

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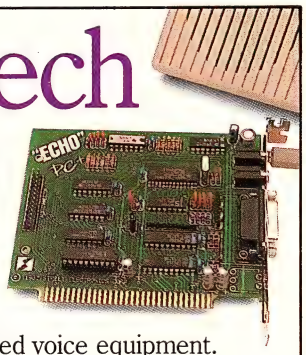

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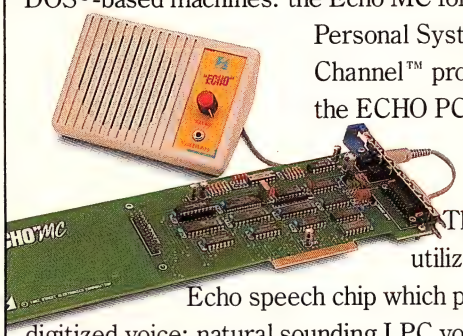

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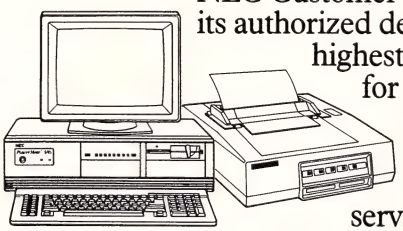

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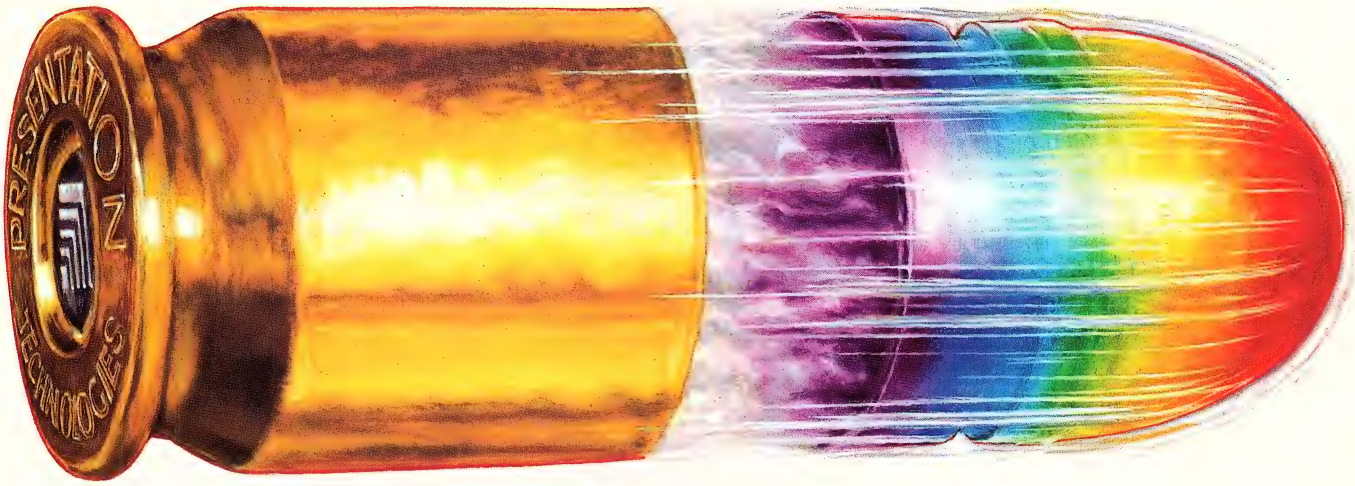

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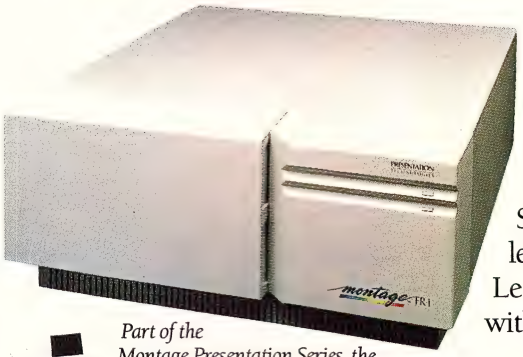

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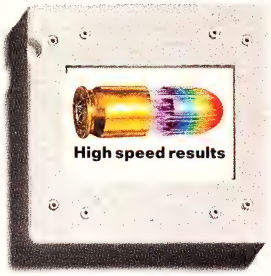

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SHOP TALK

Multiplication by Division

In early 1987 I bought a Samsung monitor for my computer. Less than three months later it stopped working. It was still under warranty, so I called the company and was told to take the monitor to the local authorized service dealer. The dealer hasn't been able to fix the monitor because it has never received the necessary part from Samsung. I've spent a great deal of time and money calling Samsung's customer service office, but to no avail.

Uday Desai
Carbondale, Illinois

Editor's note: When Consumer Watch *contacted Samsung Electronics America (SEA) in Saddlebrook, New Jersey, a spokesperson said Mr. Desai's monitor was not made by her division of Samsung Electronics, the Korean parent company.*

Consumer Watch *spoke with Mr. Desai and asked him to send in a copy of his warranty card, which did indeed bear the name Samsung Electronics America. After several follow-up calls to SEA went unreturned, the same spokesperson said there had been a lot of confusion because "many monitors got SEA registration numbers accidentally." Although she promised to follow up on the problem, nothing happened.*

Finally, after more calls, SEA service engineer Jeff Reeves contacted Consumer Watch *and explained that several independent divisions make Samsung monitors, including SEA in Saddlebrook and Samsung Electronics Corp. (or Ltd.) in Rancho Dominguez, California. Micro Five, a joint venture between SEA and a group of investors in Costa Mesa, California, sells computers and SEA monitors directly to end users.*

According to Reeves, the full name of the Samsung division responsible for the warranty (continues)

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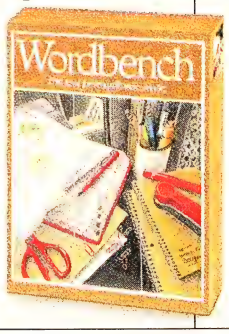

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Still Just $199 Complete. We will continue to tell you that Peachtree Complete II offers the most powerful accounting software you can buy at virtually any price. Designed and sold as a $5,000 accounting system, the latest version of Complete II represents a vastly expanded and improved product, yet sells for an incredibly reduced price of just $199. With that kind of value, and more than 250,000 satisfied users, our record speaks for itself.

Peachtree Complete II is a comprehensive accounting system developed to meet the needs of small- to medium-size businesses. It comes with eight high-power modules that may be used individually, or fully integrated for absolute maximum accounting efficiency:

- General Ledger
- Accounts Receivable
- Accounts Payable
- Invoicing
- Inventory
- Payroll
- Fixed Assets
- Job Cost

And Peachtree Complete II is designed using the latest software innovations, like full-color scrolling reference tables, pop-up windows, and short-cut keyed menus. We've increased numeric capacities as high as $999,999,999.99 in key areas, added Service Invoicing, included Range Printing, and expanded to allow an unlimited number of companies.

Error handling is quick and easy, with plain English messages and suggestions. Context-sensitive Smart HELP is on-line, all the time. And as always, Peachtree Complete II comes with the most thorough documentation — a separate quick-start Installation Guide, Accounting Primer, seven-volume Reference Library, and extensive on-line tutorials on each module — all at no extra charge.

Save Even More on Peachtree Data Query II. So while you're getting the best deal on the best accounting software, why not get an even better bargain? Extend the power of your Peachtree accounting to include the most advanced custom reporting and analysis with PDQ II, and when you buy both, save $100!

PDQ II lets you turn raw figures into highly sophisticated reports, allowing you full access to the important accounting data in your Peachtree Complete II files. From the simplest mailing labels to the most detailed budget analyses, Peachtree Data Query II opens up the potential of your computerized accounting, with no risk to your files, and no re-keying of accounting data.

And now, PDQ is easier than ever to use, with all new user instructions and on-line practice sessions that lead you through the system and build confidence as you go.

Choose from PDQ's own pre-defined reports, design your own (and store the formats for future use), even export data to popular applications like dBASE III® and Lotus 1-2-3® PDQ's simple, clear approach to report writing allows maximum control and flexibility. You can begin creating reports with PDQ in just minutes. And as you continue using it, PDQ can perform highly complex, intricate analyses.

Save a Bundle When You Buy Both. We think using PDQ to make Peachtree Complete II more than an accounting system makes good business sense. So we bundled them together and made it well worth your while. For a limited time, Peachtree's "Double Bonus Bundle" is available for just $298. That's two regularly-priced $199 packages for one low price, and that's a savings of $100. The "Double Bonus Bundle" is a limited-time offer, so call today!

And of course, if all you need is the best accounting package your money can buy, Peachtree Complete II by itself is still only $199.

Money Back Guarantee. As with all our products, we stand behind Peachtree Complete II and PDQ II with a toll-free hotline for technical support ($1 per minute, $20 minimum on your credit card). And both are covered with a 30-day money-back guarantee when you buy directly from Peachtree. If for any reason you're not satisfied, you can return the product within 30 days for a prompt refund. That's the Peachtree Software promise. (A $25 restocking fee applies to all returns.)

Hardware Specifications: Requires PC/MS-DOS version 2.0 or higher with 384K of usable memory (512K required with DOS 3.3) and a minimum 10 MB hard disk. For use with the IBM® PC, PC XT, PC AT, Personal System/2™ and compatibles. 3½" media optionally available. Not copy protected.

Compare Feature for Feature

General Ledger
- Chart of Accounts includes 76 suggested and 26,000 user-defined accounts.
- Financial statement comparisons may include current period and year-to-date with budget and/or prior period comparison.

Accounts Receivable/Invoicing
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- Tracks costs and profitability on a job-by-job basis.

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(or call 1-404-564-5800)

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(In Georgia add applicable sales tax.)

*Call for international rates.

Peachtree Software

A Member of the Intelligent Systems Family

4355 Shackleford Road, Dept. PCW, Norcross, Georgia 30093

Circle 144 on reader service card

should be written on the monitor. Consumers can call 800/524-1302 to obtain the name of the nearest authorized service center. Alternatively, consumers can request service from the factory service centers in Saddlebrook or Rancho Dominguez, but they must call for a return merchandise authorization number before sending in the merchandise for repair. Reeves adds that consumers must keep the original sales receipt to obtain warranty service; the warranty card alone is not enough.

But that's not the end of the story. Monitors are also sold by Samsung Electron Devices, another independent division in La Mirada, California. These monitors bear the Samtron label. The number for warranty information is 714/522-1282.

It's no wonder Mr. Desai had problems. Five months after writing to Consumer Watch, *he finally received a refund for his monitor from SEA, as well as compensation for his telephone expenses.*

No-Frills Mail Order

On February 3 I placed an order by mail with Telemart, expecting a three-week delay while my check cleared. On February 23 I called to check the status of my order and was told there was no record of it. I assumed that the order had been lost, so I placed a second order, prepaid by cashier's check to eliminate further delay.

Then I received my canceled check from the bank for the "lost" order. I called Telemart and was told that my original order had actually been processed on February 10. When I asked that my second order be stopped, I was told that my original order wouldn't ship until March 7. By March 2, my cashier's check still hadn't been returned.

On March 4, thoroughly disgusted by the entire affair, I decided to cancel the order. I was told I would be charged a 15 percent restocking fee, even though this fee isn't listed anywhere in Telemart's ads or on its invoices.

Brian Clark
Evanston, Illinois

Editor's note: In a telephone interview, Telemart spokesperson (continues)

it's called... WHO WORKS WHEN 1.1

"...outstanding."
—*InfoWorld, March 15, 1988*

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Every Employee
In *Seconds!*

NOW WITH ROTATING SHIFTS!

For Businesses With Multiple:
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Circle 9 on reader service card

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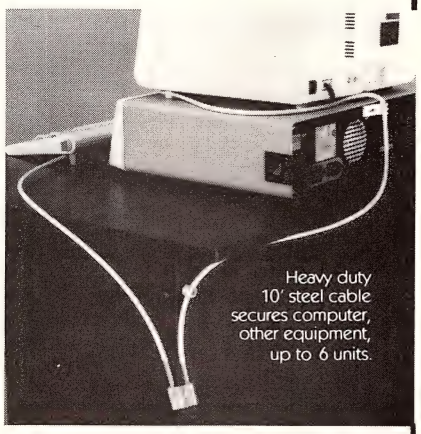
Unique Kāblit fasteners attach to equipment without drilling, using existing screws. Cable passes through fasteners preventing removal. Cable is then locked. When ordering multiples, specify locks keyed differently or alike. Installs in 10 min. Over 80 college installations.



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Dealer Inquiries Invited

Circle 31 on reader service card

You'll recognize the page on the bottom as the one printed on the HP LaserJet Series II™—the industry standard for laser printing.

Notice that the page on top looks remarkably similar. In fact, it's identical right down to the HP typeface.

But it was printed on the Acer LP-76™—the only actual 100% HP-compatible laser printer available. With all six resident fonts and 21 optional font cartridges identical to those developed for HP.

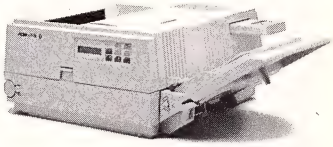
Other laser printers talk about compatibility. But the Acer LP-76 is the first and only one to deliver true font compatibility with the HP LaserJet Series II. And that's very important. Especially when your office is producing large documents on multiple printers, and you want your fonts to look identical from page to page.

The Acer also duplicates such HP standards as 512K of memory. With 1, 2 and 4MB of memory expansion. Plus 300 DPI graphics, face-up and face-down output capabilities, and full access to any software that recognizes the Series II.

Of course, we stopped short of duplicating everything about the Series II.

For instance, the Acer LP-76 is faster, smaller, lighter and much less expensive.

So give us a call at (800) 538-1542 ext. 763. In California, (800) 782-1155 ext. 763. We'll quickly help you place our name with the right face.



You may recognize the faces but not the name.

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Tel. (03) 865-0191 2
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Tel.: (02) 713-2252

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HP LaserJet Series II is a trademark of Hewlett-Packard.

Circle 179 on reader service card

Paul Farnell said that Clark's original order had been made under a business name, Clark Audio Design. However, according to Farnell, when Clark called to check on the order, the clerk was given the name Brian Clark and found no listing.

Farnell confirmed that the restocking fee is not listed in Telemart ads. "The reason we choose not to put that policy in our ads is that it implies we take items back," he says. "There are cases where if someone makes an error we'll take the item back. But if the order has already been processed or shipped, we charge a restocking fee to meet our costs." Farnell says that Clark's order had already been processed when he called to cancel.

Logicsoft Goes Under

MSC International and five subsidiaries, including mail-order companies Logicsoft, Micro to Go, and Moneysworth, filed for Chapter 11 bankruptcy reorganization on June 6, 1988.

The company names and case numbers are as follows: MSC International Inc., d/b/a MSC Federal Micro Services, formerly MSC Measurement Sciences Corp., case no. 088-80516-21; Print 360 Inc., case no. 088-80517-21; Logiclabs Inc., d/b/a Fast Computer Co., case no. 088-80518-21; Micro to Go Inc., case no. 088-80519-21; Moneysworth Computer Products Inc., case no. 088-80520-21; and Logicsoft Inc., case no. 088-80521-21.

Consumers with claims against any of these companies should file a proof-of-claim form with the U.S. Bankruptcy Court, Eastern District of New York, 601 Veterans Memorial Hwy., Hauppauge, NY 11788; 516/361-8601. At press time, the filing deadline had not been set.

What's My Line?

In August, *Consumer Watch* reported that mail-order company SupplyLine in Lombard, Illinois, showed no signs of being in business. That company should not be confused with Supply Line in Claremont, California, which is very much alive. Writes company vice president Mike Bivens: "Many people who tried to reach SupplyLine in Illinois obtained our 800 number and have become our customers. But please let your readers know that we're a

(continues)

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Circle 219 on reader service card

A Positive Point About Breast Cancer.

Now we can see it before you can feel it. When it's no bigger than the dot on this page.

And when it's 90% curable. With the best chance of saving the breast.

The trick is catching it early. And that's exactly what a mammogram can do.

A mammogram is a simple x-ray that's simply the best news yet for detecting breast cancer. And saving lives.

If you're over 35, ask your doctor about mammography.

Give yourself the chance of a lifetime.™

AMERICAN CANCER SOCIETY®

VGA WONDER™

1024X768

plus: VGA EGA MDA HERCULES on: STANDARD MULTISYNC monitors

Yes! the Phenomenal VGAWONDER does it all at IBM Hardware level compatibility with automatic monitor detect and no dip switches or jumpers to set. A HOT CARD for the 286/386 POWER USER with AUTO BUS DETECT for 8 or 16 bit slots, running with a 16 bit datapath with 1:1 interleave. 100% IBM HARDWARE LEVEL COMPATIBILITY means that ALL software and operating systems designed for IBM systems will run. 1024 WILL BE DISPLAYED IN COLOR ON STANDARD MULTIFREQUENCY MONITORS.

Although these features are expected from ATI they are NOT AVAILABLE from other manufacturers. EGA on all monitors including RGB & TTL means a perfect card for networks. MOUSE ON BOARD! ATI built the mouse right in to this one, why not? No extra charge! 16-bit datapath for those FAST speeds required at high resolutions. VGAWONDER is available in both 512K and 256K Versions. Ask your dealer for more information.

Available from Leading Computer Dealers.

See us at
COMDEX/Fall '88
November 14–18, 1988
Las Vegas Hilton Hotel
Las Vegas, Nevada
Booth 7050

SUGGESTED LIST PRICE
$499.00
VGA WONDER with 256K Video Memory

NOW SHIPPING

Software	RESOLUTION	COLOR/SHADE SPECTRUM
ATI HI-RESOLUTION DRIVERS SUPPLIED	1024x768	16/256 K
ATI HI-RESOLUTION DRIVERS SUPPLIED	800x600 * 640x480	256/256 K
VGA	320x20 ALL 17 MODES	256/256 K
EGA	640x350	16/64
CGA	320x200	16/64
MDA	720x348 640x400	

LINES OF TEXT	132x44	132x25	132x44	132x60		132x60	
Monitor	TTL	RGB	EGA	MULTISYNC ANALOG	IBM 8503/12/13	MULTISYNC XL/PLUS	IBM 8514
	DIGITAL			ANALOG			

*800x600 CANNOT BE DISPLAYED ON 8503-12-13

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Circle 302 on reader service card

FINALLY!

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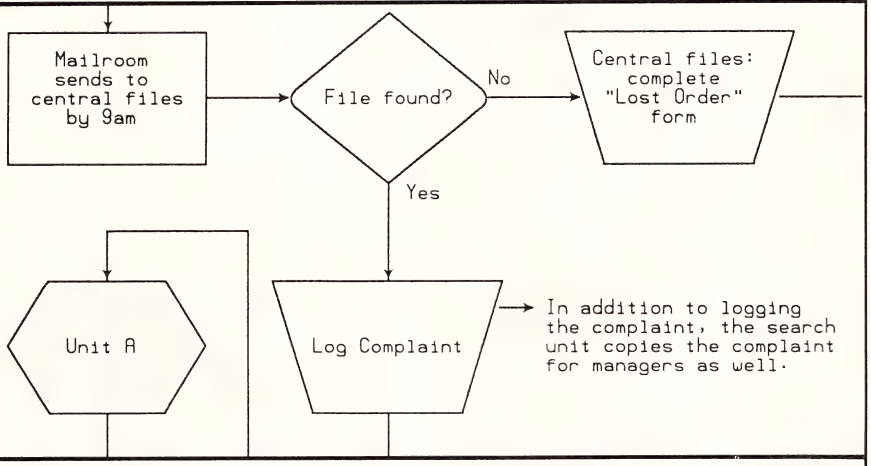
EASYFLOW

An on-screen flowchart processor that knows about flowcharts - not just another "screen draw" program that makes you do most of the work. EASYFLOW is a powerful full-screen graphics program dedicated to flowcharts and organization charts. With it you can quickly compose charts. More important, you can easily modify charts so they are always up to date.

- **Automatic:** Fully automatic text centering within shapes, both horizontally and vertically. Fully automatic line routing & re-routing.
- **Fast:** Written in assembly language for speed.
- **Large:** Charts up to 417 columns wide by 225 lines high. Chart too large for your printer? EASYFLOW automatically breaks the chart up & prints it in page size pieces.
- **Standard:** All standard flowcharting shapes included. Custom shapes can be ordered.
- **User friendly:** Don't take our word for it. PC Magazine says "*EASYFLOW lives up to its name. It's hard to imagine any easier and more flexible way to produce basic and even complex flowcharts*". [March 10th 1987 issue, page 278.]
- **Mouse:** Optional but fully supported.
- **It prints:** On most popular matrix printers including IBM, Epson, Toshiba, HP LaserJet, LaserJet-Plus and many others.
- **It plots:** On HP7440, 7475, 7550, 7570, 7585B and compatible plotters.
- **It works:** We are contractually prevented from mentioning the name of the "big eight" accounting firm that purchased a world-wide site license, but we can tell you that they spent months evaluating all available flowcharting packages before choosing EASYFLOW.
- **Rush delivery:** Order by noon today (eastern time) and you'll have it tomorrow. Rush delivery charge is $10.50 (instead of $2.00) and is available only to continental USA and Canada.
- **Documented:** 100 page manual plus over 150 screens of context sensitive help.

EASYFLOW works on IBM PC's, IBM PS/2 and compatibles. Requires 384 K memory, DOS 2.0 or higher and an IBM CGA/EGA/VGA or Hercules monochrome compatible adapter card.

Order direct for only **$149.95** + $2.00 S&H (USA/Canada), $10.00 (foreign). Payment by M.O., cheque, VISA, Mastercard or Company PO.



The chart fragment above was produced on an HP LaserJet-Plus and is actual size and unretouched. Publication quality charts like this can be produced using only minutes of preparation time and seconds of print time.

HavenTree Software Limited
PO Box 1093-M
Thousand Island Park, NY 13692

Order Desk: 1-800-267-0668
Information: (613) 544-6035 ext 47
Telefax(G3): (613) 544-9632

Circle 79 on reader service card

going concern and not affiliated with the other company."

Bivens says Supply Line sells "everything that goes under, around, and through a computer —diskettes, software, peripherals, and so on." The company's phone number is 800/648-7376 in California, or 800/422-3392 outside California.

To send correspondence or to submit material for publication in this column, please see How to Contact PC World, page 4.

POWER TIP NO. 19

Help for 1-2-3 Password Users

Forgetting the password assigned to a *1-2-3* release 2.x file can be cause for alarm. But if you get an 'incorrect password' error message, remember that *1-2-3* password checking is case sensitive. In a pinch, try entering the password in both uppercase and lowercase letters before you hit the panic button. (Use /File Save <F1> for help on using passwords.)

Thomas Oniguchi
Santa Clara, California

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If you need the highest level of comparative data... NSTL's *PC Digest* is the solution.

Last year, *PC World* designated National Software Testing Laboratories as its official research facility. And for good reason.

NSTL is the leading independent research organization exclusively devoted to testing PC hardware and software. Our knowledge, experience and skilled technical staff enable us to generate analytical data so accurate, comprehensive and meaningful that no one else can match it.

PC Digest is our comparative ratings report on IBM-compatible PCs and peripherals. It's the *authoritative* source for objective, scientific hardware evaluations.

Granted, this unusual publication is not for everyone. But if you need to go *beyond* the ads and the reviews...if you require a *deeper level of analysis*...if your work calls for *complete* and *systematic* data to guide your buying decisions...then *PC Digest* is the only place to turn.

The ultimate hardware reference tool.

Today, the PC marketplace is more crowded and confused than *ever* before.

PC Digest evaluates a wide range of PCs and peripherals.

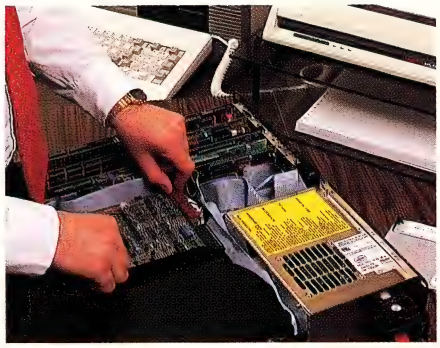
How can you be *certain* a piece of equipment will prove reliable? That it will do all it claims? That it will be compatible with your existing system? How can you make truly *informed* buying decisions?

There's only one *sure* way to evaluate the hundreds of competitive products. They must be *tested*. Head-to-head. Feature by feature. Against precise, scientific benchmarks. Performing real-world business tasks.

Only *PC Digest* performs this exacting research process. There is no other resource that even comes close.

Every major PC and peripheral is evaluated.

New equipment is a major investment. And, for most organizations, buying PCs and peripherals is a *continuous* process — not a one-time event.



Skilled engineers spend weeks methodically testing each piece of equipment.

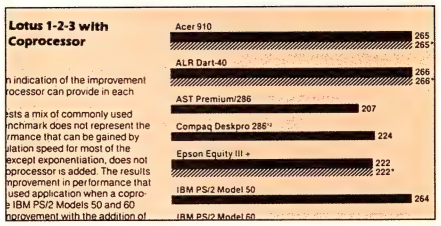
PC Digest can help you make the *right* decisions — and *avoid* expensive mistakes. Arriving each month, it's an *ongoing* reference source for a wide range of products. For example:

✓IBM and compatible 286 and 386 machines ✓Laptops ✓Modems ✓Laser printers Backup systems ✓VGA boards ✓Monitors ✓Network adapters ✓Memory expansion cards ✓Disk drives ✓Hard disk cards ✓Other mass storage devices ✓Accelerator boards ✓Dot-matrix printers ✓Co-processors ✓Scanners ✓And more

For each product, we determine: How easy is it to set up? What are its features and capabilities? What special system requirements are necessary? How well does it work with major business software? How fast does it perform typical tasks? How good is the documentation? How does it function under DOS and OS/2?

We tell you which products are *best* — and which have *problems*. And we make *specific recommendations* based on the hard data our tests uncover. (Specifications and prices are included.)

Users applaud *PC Digest*'s graphic format. Test results are clear, readable and accessible. Quick-reading charts show how products stack up against each other.



Benchmark test results show how each product scored while running major business software programs.

Couldn't the concrete, research-based data supplied *only* by *PC Digest* help you improve your product selection decisions — and save you time, money and hassles?

Objective, scientific testing standards.

Why is *PC Digest* so widely used — and so highly regarded?

For a start, no one else can equal NSTL's resources. Our laboratory facilities are state-of-the-art. Our staff of skilled engineers and technicians draws upon a wealth of "hands-on" experience that can be gained only by scientifically testing PC products day after day.

PC World announces an innovative partnership.

"*PC World* has entered into an unprecedented arrangement to have our review process conducted by National Software Testing Laboratories.... NSTL has the reputation for undertaking the most comprehensive performance and versatility tests of software and hardware products in our industry....They're going to *tell* it like it is — not *sell* it like it is."

— **David Bunnell,** Chairman

"We've recognized the increasing need for performance testing that measures products from a real-world perspective....That's why we have selected National Software Testing Laboratories of Philadelphia, Pa. as the exclusive test facility for all products reviewed in *PC World*."

— **Richard Landry,** Editor

"*PC World* is proud to include benchmarks and evaluations from the industry's leading source of unbiased product information....NSTL has earned a reputation as the Underwriters Laboratories of the PC industry. Renowned for its exacting, objective methodology, [its] solid reputation has been built by a staff as fastidious as a team of wary tax auditors."

— **Eric Knorr,** Senior Associate Editor

go to test equipment?

testing lab.

Performance tests are *applications-based.* We test machines with popular software such as the major spreadsheet and database programs. In contrast, many magazine reviews use misleading "raw processing" benchmarks that bear little relation to real-world business tasks. And the loose-leaf data services, despite their imposing appearance, perform *no* testing at all.

PC Digest is fiercely independent. We have a firm policy of accepting *no ads.* That gives us the freedom to be *fully objective and unbiased* in our product evaluations.

Without vested interests of any kind, we can be *totally* impartial. We're free to print *exactly* what our tests reveal — and we don't pull our punches.

Monthly "Buyer's Alert" keeps you on top.

Selecting equipment is a never-ending process. That's why *PC Digest* monitors the fast-changing PC marketplace on an *ongoing* basis. It keeps you a jump *ahead* of events.

So it's not surprising that *PC Digest* frequently "scoops" the computer industry press. With the *first* comprehensive benchmark tests of IBM's PS/2 line. The *first* tests of the Compaq and IBM 25MHz PCs. And the *first* tests of OS/2's multitasking abilities.

ACCELERATOR BOARD FEATURES	Breakthru 286	Fastcache 286	Inboard 386	Mach 10	PC/turbo 286e-10	Racecard 286	SpeedPac-
Speeds up IBM PC-1	Y	Y	N	Y	Y	Y,R	Y	N
Speeds up IBM/XT	Y	Y	N	Y	Y	Y	Y	Y
Speeds up IBM/AT	N	N	Y	N	N	N	N	N
Microprocessor	80286	80286	80386	8086	80286	80286	80286	80
Memory Cache	16K	8K	64K	8K	N	8K	8K	12
On-board memory	N	N	OP1	N	1024K	N	N	N
Computer processor retained	N	Y	N	N	Y	N	N	N
Change Speed	Y,S	Y,S	Y,S	Y,E	Y,S	Y,I	Y,I	Y,
Change speed without rebooting	Y,S	N	Y,S	Y,E	Y,S	N	N	Y
Change speed within application	N	Y,K	Y,K	N	N	N	N	N
Disk caching included	Y	Y	N	N	Y	N	N	Y
RAM disk included	N	Y	N	N	Y	N	N	Y
Print spooler included	N	Y	N	N	Y	N	N	Y
Logo/short card	SH	SH	L	L	L	SH	SH	L

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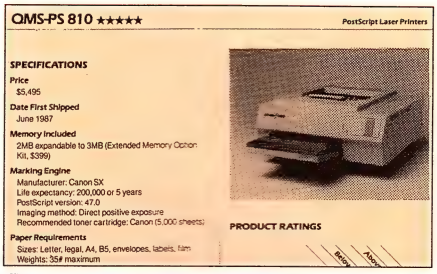
QMS-PS 810 ★★★★★ PostScript Laser Printers

SPECIFICATIONS

Price
$5,495

Date First Shipped
June 1987

Memory Included
2MB expandable to 3MB (Extended Memory Option Kit, $399)

Marking Engine
Manufacturer: Canon SX
Life expectancy: 200,000 or 5 years
PostScript version: 47.0
Imaging method: Direct positive exposure
Recommended toner cartridge: Canon (5,000 sheets)

Paper Requirements
Sizes: Letter, legal, A4, B5, envelopes, labels, film
Weights: 35# maximum

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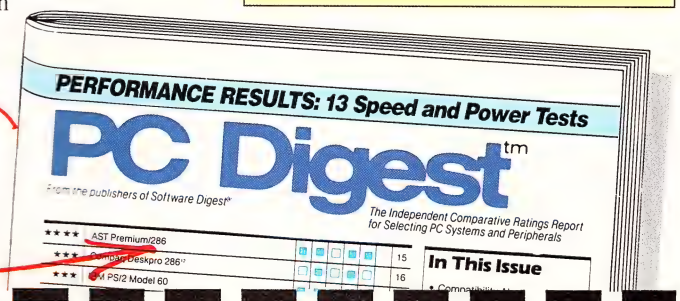

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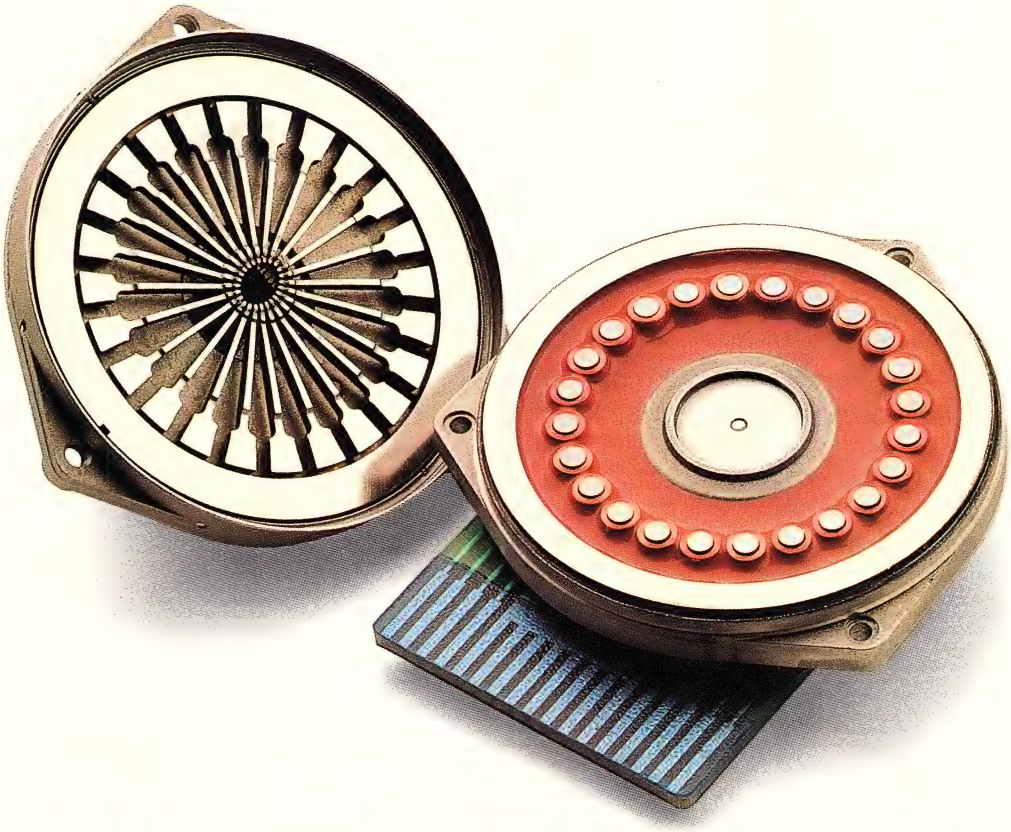

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THE UPGRADE PATH

Hands-on advice for upgrading PCs, compatibles, and peripherals

The Upgrade Product of the Year and extra slots for the PC

Robert Luhn

Magical Memory Management for the 80286

Hyperbole is hardly new in the PC marketplace, especially when it comes to upgrade products. Companies are always claiming that their upgrades "triple your processing speed" or "turn the XT into a multiuser system," so naturally I approached the All Chargecard with some skepticism. After all, All Computer Inc. claims its little memory-management board allows the 80286 to directly access up to 16MB of EMS 4.0–compatible expanded memory.

A simple trick, you might think, until you consider the implications. Ease this tiny board between an 80286 chip and its motherboard socket, and your system can use any combination (up to 16MB) of expanded and extended memory as expanded memory. You also won't have to disable motherboard RAM to get the full benefits of multitasking programs such as *Desqview*. Better still, the Chargecard can access the memory addresses between 640K and 1MB, effectively boosting user RAM to 960K. The Chargecard even lets you run *PC-MOS/386*.

The company also throws in a RAM disk program designed to retain its data when the system is rebooted, plus a passel of memory-mapping and -management utilities. All this and a 5-year warranty for only $399.

The biggest shock of all? The Chargecard actually works as claimed. What other product es-

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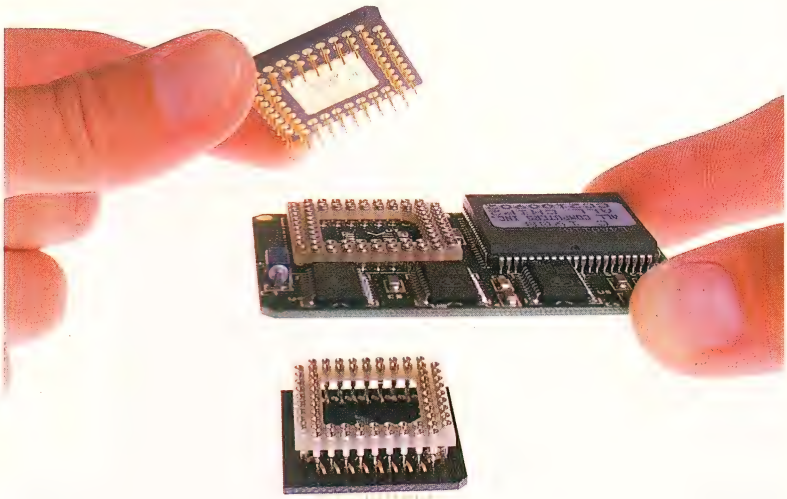

JERRY SPAGNOLI

Installing a Chargecard can take three steps. Plug the 80286 into the Chargecard, slip the duo into the socket extender, and then push the assembly into the waiting motherboard socket.

sentially doubles your system's conventional work space for those mega-worksheets, data bases, and documents or those crucial but RAM-hungry memory-resident programs? What other board lets *Desqview* use *all* installed memory for multitasking applications? If you own an 80286-based system (including the PS/2 Models 50 and 60), the Chargecard is a must buy.

Just keep in mind that the Chargecard can be difficult to install. The process basically involves removing the system's 80286 chip, plugging it into the Chargecard, and then plugging the assembly back into the 80286 socket. Unfortunately, the microprocessor socket in many systems—including the IBM PC AT Model 339 upgraded here—is surrounded by capacitors. Try to push the Chargecard flush into the socket, as directed, and you'll mash the capacitors and possibly disable the motherboard. Another complication: One of the plastic feet that secure the motherboard to the system chassis prevents the Chargecard from snapping into place.

There are two solutions to these knotty problems. Upgraders on a budget can remove the motherboard, pull out the obstreperous plastic foot, *gently* bend the capacitors away from the 2½-by-1½-inch Chargecard, force the Chargecard into the 80286's socket, and reinstall the motherboard. (For tips on removing a motherboard, see "The Ultimate Turbo Board," *The Upgrade Path*, *PCW*, November 1987.) A simpler, albeit more expensive, remedy is to buy the company's $100 socket extender. (You may need this adapter anyway if your system's 80286 is planted on the motherboard in a leadless chip mount.) However, since this raises the Chargecard another quarter-inch off the motherboard, you'll probably have to relocate the system's disk controller to another 16-bit slot. Tools of the upgrade: small flat-blade and Phillips screwdrivers, an 80286 chip puller (supplied by the company), and a pair of needle-nose pliers (for removing the plastic foot).

Before you wrangle with the Chargecard, reconfigure all expanded memory boards as extended memory, and run the computer's setup program to record the change. Then park the AT's hard disk, turn off the system, unplug all external cables, remove the system cover, and ground yourself before touching the system or any component.

Locate the 80286 chip (just behind and to the left of the hard disk drive in an IBM AT), swivel the computer so the disk drives are to your right, and remove any boards that obstruct your view. Slide the chip puller's prongs between the 80286 and its socket, and lift up gently. Repeat the procedure on at least one other side of the chip (it may be impossible to get at all four sides) and the chip should ease out. Note: Remember what direction the notch on the 80286 is facing—you'll need this information later. Take the Chargecard out of its antistatic bag and plug the 80286 into the socket on the card. The chip should be firmly socketed but not necessarily flush to the board.

Install the Chargecard as if you were reinstalling the 80286—as you lower the Chargecard's pins into the empty 80286 socket, make sure the 80286's notch is pointing in the proper direction. If you have trouble lining up the pins, shine a lamp on the motherboard and peek through the computer's backplane. Now survey the situation. Will pressing the Chargecard into the socket crush capacitors and other components in the immediate vicinity? Is one of the motherboard's feet getting in the way? If not, plug in the Chargecard. It needn't be perfectly flush in the socket, but pretty darn close. If there are obstructions, either use All Computer's socket extender or remove the motherboard and follow the procedure outlined previously.

Once the Chargecard is in place, reassemble the system and turn it on. You'll discover that the Chargecard's considerable powers aren't available until you install device drivers that specifically tap each talent. Thankfully, the company supplies a prompt-driven installation program that copies over the necessary drivers (for expanded memory, the RAM disk, and accessing 960K of user RAM) and modifies or creates AUTOEXEC.BAT and CONFIG.SYS files. The process is straightforward, and if you dig around the Chargecard's somewhat muddled user manual you'll discover hundreds of tips for tweaking the system.

The Chargecard isn't perfect. It can be a pain to install and its drivers can soak up 64K of RAM. Note, too, that the company's RAM disk program has a bug that prevents it from retaining its contents when the system is rebooted. The manufacturer also notes that the Chargecard won't work in the AT&T 6300 Plus, Zenith Z-248/12, and 80286

(continues)

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PC Magazine

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systems from Sanyo and Indtech Systems.

But the Chargecard's talents far outweigh its quirks. If you want to unlock the memory hiding in your system for *1-2-3*, *Desqview*, and a thousand other programs, get the Chargecard. It's definitely the Upgrade Product of the Year.

WHERE TO BUY

All Chargecard
All Computers Inc.
21 St. Clair Ave. #203
Toronto, Ontario
M4T 1L9 Canada
416/960-0111
List price: $399; socket extender $100
Requirements: 80286 chip
Warranty: five years
Extended warranty: none
Technical support: unlimited, no toll-free number, M-F 9-5
Other support services: BBS
For more information, circle 660 on reader service card.

One PC, Two Buses

Back in the early 1980s when the PC was new, expansion boards generally boasted a single option, such as a serial port, RAM, or video circuitry. As you might imagine (or remember), it didn't take long to fill up the PC's five slots. Today, with the availability of cheap internal modems, expanded memory boards, graphics boards, and the like, slot cram hasn't abated. The solution—now, as then—is to connect an expansion box with extra slots to your PC.

This may strike some as a fuddy-duddy upgrade, but it's incredibly easy to accomplish. If you're one of the many millions who rely on a faithful PC, XT, or compatible system that's out of slots, consider the merits of the PC-Xtra from PC Horizons. The company has crafted a 6-slot box about half the size of the PC that closely resembles its inspiration—from its beige paint job to its noisy fan and impossible-to-remove cover. You can put any board in the PC-Xtra except a color graphics board; the unit's 50-watt power supply will keep things humming. Connecting the PC-Xtra to your PC takes about 5 minutes and requires small flat-head and Phillips screwdrivers.

As always, park the PC's hard disk if it has one, turn off the system, unplug all external cables, remove the system cover, and ground yourself before touching the system or any component. Place the PC-Xtra to the left of the PC and remove its cover. Don't yank the cover off or you could snag cables or damage the unit's power supply. The gray data cable that connects the PC-Xtra to the PC is inside the unit, plugged into a slot; pull the white connector out of the slot and poke it through the PC-Xtra's backplane. (*Don't* remove the other end of the cable that's attached to the PC-Xtra's motherboard.) Install any expansion boards in the PC-Xtra, put the hood back on, and screw it down.

Now find a free slot in the PC (or remove an existing board), remove its slot cover, fold the connector end of the data cable over into a triangular shape, and slip it through the backplane. When you plug the PC-Xtra connector into the slot, make sure the black stripe on the edge of the data cable is nearest the PC's backplane. At this point the manual directs you to put the slot cover back in place, but the PC-Xtra's data cable clearly makes that impossible. No matter—the opening is effectively closed off.

Before you reassemble the PC, reset its DIP switches to reflect any new devices added to the PC-Xtra. If you're merely moving boards from PC to PC-Xtra, you can leave the DIP switches alone.

You won't need to hunt down a wall socket to power the PC-Xtra, thanks to its unique double-headed plug. One head plugs into the monitor's power outlet on the back of the PC; the other head connects to the monitor's power cable. Turn on the PC, and both units are up and running.

Simple, direct, and quick—the best kind of upgrade. If PC Horizons cut the PC-Xtra's price in half—a reasonable request, given the simplicity of the product—it would be the perfect upgrade. But the PC-Xtra does the job and that may well be worth the price of admission.

WHERE TO BUY

PC-Xtra
PC Horizons, Inc.
1710-M Newport Circle
Santa Ana, CA 92705
714/953-5396
List price: $549
Requirements: 8-bit slot
Warranty: one year, two years on the power supply
Extended warranty: none
Technical support: unlimited, no toll-free number, M-F 8-5
Other support services: none
For more information, circle 661 on the reader service card.

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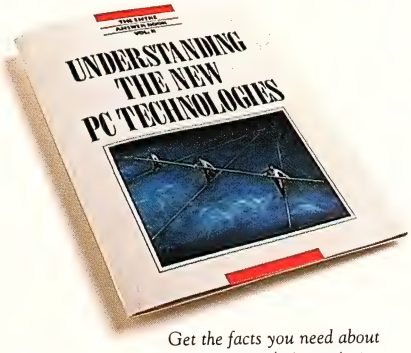

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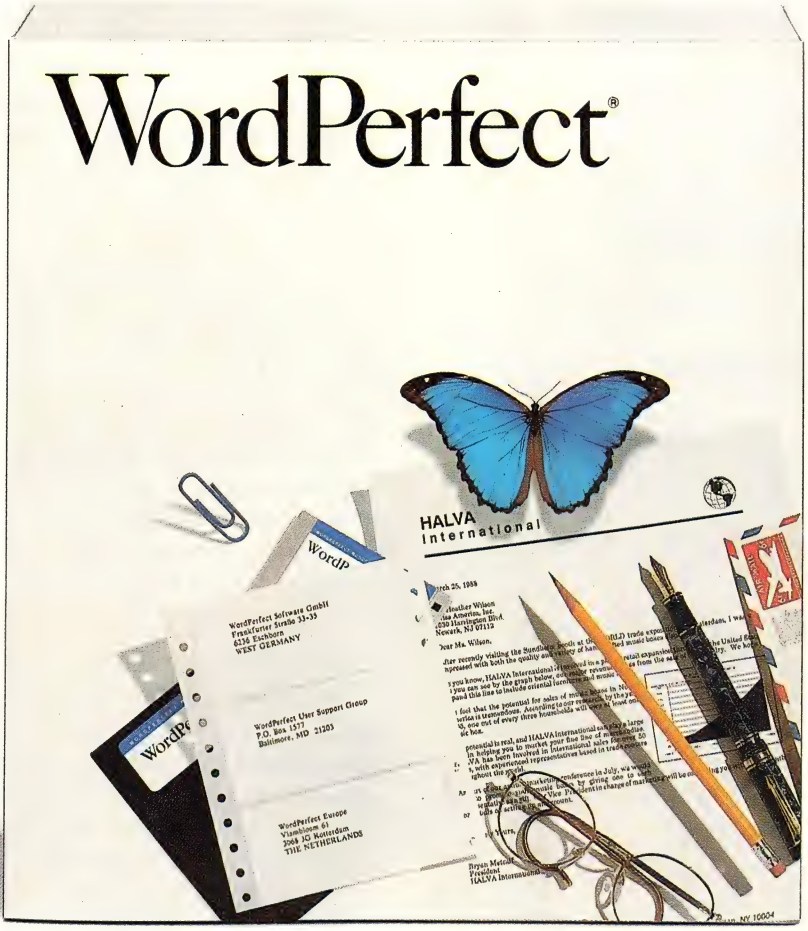

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Circle 175 on reader service card

THE HELP SCREEN

PC World offers answers and advice at every level

Back off to back up, untangle a twisted definition, make cents of an IBM keyboard, fight .BAK fragmentation, find the disk with DEBUG, locate a rack-mounted PC, and recognize when to clean your floppy drive's heads.

Karl Koessel

ANTHONY RUSSO

At the End of My Tape

Q. *I'm the office manager for a small private dental practice. I've been using an AT for four years to track appointments and billings. The AT is equipped with an Alloy tape unit, which we use every night to perform a full backup of the hard disk files.*

When the hard disk died three weeks ago, having the backup tape was a blessing; I simply restored the files from the tape to the replacement drive and was immediately up and running. Now, however, the tape drive isn't working. No matter what I choose from the backup menu, the tape drive's backup program tells me that no files were found on the hard disk and so none were backed up. But I know the hard disk has lots of files. What's wrong? Do I need a new tape backup unit?

By the way, the guy who maintains our system just added something that makes the time of day tick away in the upper right corner of the screen. I find it terribly annoying. Can you tell me how to get rid of it?

Kathy May
San Francisco, California

A. I'll bet your tape backup quit working the day your maintenance person added that clock. The technical explanation is that the clock and tape programs are trying to use the same DMA (direct memory access) channel. In lay terms, your system is trying—and failing—to do two chores at a time.

Since you don't need the clock while you're backing up, you could make a bootable disk for drive A: and use it to boot the AT when you want to back up. Booting off the floppy disk will prevent the memory-resident clock program from installing and conflicting with the tape backup program. However, since you don't want the clock anyway, let's take out the command that installs it.

Use your word processor's nondocument (also called ASCII text) mode to edit the AUTOEXEC.BAT file found in the root directory of the hard disk. Look for the line that refers to the clock program (if it's not obvious which line it is, call your maintenance person) and delete it. Then save AUTOEXEC.BAT as an unformatted ASCII text file and reboot the AT. The clock should no longer appear on your screen, and the tape backup program should work as it always has.

Twisted Pair

Q. *I want to install a small network at the office. It calls for twisted wire to connect the computers. Why is twisted wire needed? Would speaker cable or doorbell wire work as well? (Doorbell wire is often solid, with two wires running parallel inside a sheath.)*

Henry Hilliard, Jr.
Houston, Texas

(continues)

A. Your network calls for twisted-*pair* wiring, not twisted wires. Twisted-pair wiring is two wires that twist around each other inside their common sheath. Twisted-pair connections are less susceptible to electromagnetic interference, which can damage the data packets that are sent around the network, than parallel-wired links. Fewer damaged packets means fewer packets that must be retransmitted, and therefore better performance from the network.

However, the length of the wire and the transmission speed of the network also affect the frequency of damaged packets. Many small networks have nodes fairly close together and transmit slowly enough that parallel wiring, like speaker or doorbell wire, works just fine. In fact, many small-network cards use standard (parallel) phone line to connect nodes.

Cents, You've Been Gone

Q. *I've been using IBM and Compaq PCs since they were first marketed, but I can't find any manual, magazine, book, or person who can tell me why the cent symbol (¢) was omitted from the PC's keyboard. Any clues?*

Rodney Wren
Summerfield, Florida

A. When the IBM PC was introduced, ANSI's ASCII (the American National Standards Institute's American Standard Code for Information Interchange) had already been adopted by most microcomputer hardware and software companies. IBM followed suit with its PC. Unfortunately, ¢ was not part of the ASCII definition, and printers either could not print that character or required a special code to produce the cent sign.

Since ASCII is a 7-bit standard, only 128 (2^7) characters and control codes (tabs, carriage returns, and codes for clearing the screen, moving the printer carriage one line, and so forth) can be specified. Because the IBM PC is a full 8-bit machine, IBM decided to extend the ASCII character set with 128 additional special characters or codes, one of which is ¢ (see **TABLE 1**). These days, most IBM PC–compatible programs and printers accept, display, and print the IBM PC's extended ASCII character set.

To enter ¢, hold down the <Alt> key, enter 155 on the numeric keypad, and then release <Alt>. (You can use the same technique to enter any of the characters in **TABLE 1**.) Then try printing it. If you don't get a ¢, don't give up immediately. It may be that your printer has more than one character set and that the IBM set is not the de-

(continues)

ASCII code	Character	ASCII code	Character	ASCII code	Character	ASCII code	Character
128	Ç	160	á	192	└	224	α
129	ü	161	í	193	┴	225	β
130	é	162	ó	194	┬	226	Γ
131	â	163	ú	195	├	227	π
132	ä	164	ñ	196	─	228	Σ
133	à	165	Ñ	197	┼	229	σ
134	å	166	ª	198	╞	230	µ
135	ç	167	º	199	╟	231	τ
136	ê	168	¿	200	╚	232	Φ
137	ë	169	⌐	201	╔	233	Θ
138	è	170	¬	202	╩	234	Ω
139	ï	171	½	203	╦	235	δ
140	î	172	¼	204	╠	236	∞
141	ì	173	¡	205	═	237	φ
142	Ä	174	«	206	╬	238	ε
143	Å	175	»	207	╧	239	∩
144	É	176	░	208	╨	240	≡
145	æ	177	▒	209	╤	241	±
146	Æ	178	▓	210	╥	242	≥
147	ô	179	│	211	╙	243	≤
148	ö	180	┤	212	╘	244	⌠
149	ò	181	╡	213	╒	245	⌡
150	û	182	╢	214	╓	246	÷
151	ù	183	╖	215	╫	247	≈
152	ÿ	184	╕	216	╪	248	°
153	Ö	185	╣	217	┘	249	∙
154	Ü	186	║	218	┌	250	·
155	¢	187	╗	219	█	251	√
156	£	188	╝	220	▄	252	η
157	¥	189	╜	221	▌	253	²
158	₧	190	╛	222	▐	254	■
159	ƒ	191	┐	223	▀	255	

TABLE 1: The IBM PC's extended ASCII characters

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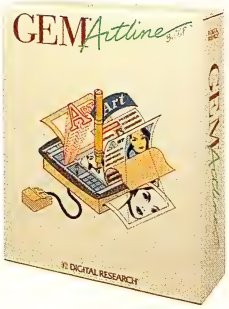

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Circle 266 on reader service card

fault. Check your printer's manual for available character sets and the instructions for invoking them. For example, the IBM PC's character set can be made the default on all current Epson printers by setting a DIP switch (or by pushing front panel buttons for the switchless models) or by sending the printer an Escape t1 Escape 6 (the ASCII sequence, in decimal, 27, 116, 49, 27, 54).

Unwanted .BAK Files

Q. *I have a problem with* Webster's New World Writer. *For a professional word burner like me, with dozens of novels, short stories, and articles in various stages of completion, this word processor is great, mostly because of its excellent thesaurus and spelling checker.*

Unfortunately, whenever a file is edited, Webster's *insists on making a .BAK file out of the original. This action rapidly fragments my hard disk. I use* FastTrax *regularly to clean things up, but there is the ever-present dread of risking a chapter or more if something goes wrong.*

Simon & Schuster insists that I can't eliminate this unwanted feature and suggests that I use a batch file to automatically delete the unwanted .BAK files. I didn't need this simplistic solution, and it doesn't solve the fragmentation problem anyway.

I could *change word processors. Borland's* Sprint *sounds like it might be the one I'd be most comfortable with, but I'd still need to use* Webster's *to check spelling. I shudder every time I think of having to use two word processors. Can you help me?*

John A. Nelson
Guerneville, California

A. Two things first: *Sprint* has a spelling checker (see *The Software Shelf* in this issue), so if you opt for *Sprint,* you won't have to use *Webster's* too. Furthermore, because disk file allocation is a function of DOS, your files would get fragmented even if your word processor didn't make .BAK files.

That said, there are a few things you can do to reduce the amount of disk fragmentation. You can implement a RAM disk that's a little bigger than three times the size of the largest document you'll save (see VDISK.SYS in the DOS manual's chapter called "Configuring Your System"). (*Webster's,* like most word processors, creates a temporary copy of the file while you're editing, removing it only after the original has been renamed with the .BAK extension and the new edit has been saved. Therefore, you need space for all three files.) If your system has extended memory, producing a large enough RAM disk should not be a problem. (If you have an expanded memory board, you'll have to use the RAM disk program that came with it—if one did. Better yet, if you can configure some of that expanded memory as extended memory, do so and use VDISK.SYS for the RAM disk.) Otherwise, VDISK will use conventional RAM; hopefully your system has a full 640K worth. Once you've installed a RAM disk, you'll want to tell your word processing program that your document files are on that drive.

Before editing a file, you'll need to copy it to the RAM disk. Then you can start editing as you normally do, by typing WWP followed by the file name. When done editing, save the document, exit the word processor, copy the newly saved file from the RAM disk to the hard drive, and delete the files in the RAM disk. (You may want to create a batch file that performs all four steps for you.) Because the .BAK file and the temporary file are not saved on your hard disk, fragmentation is reduced, though not eliminated.

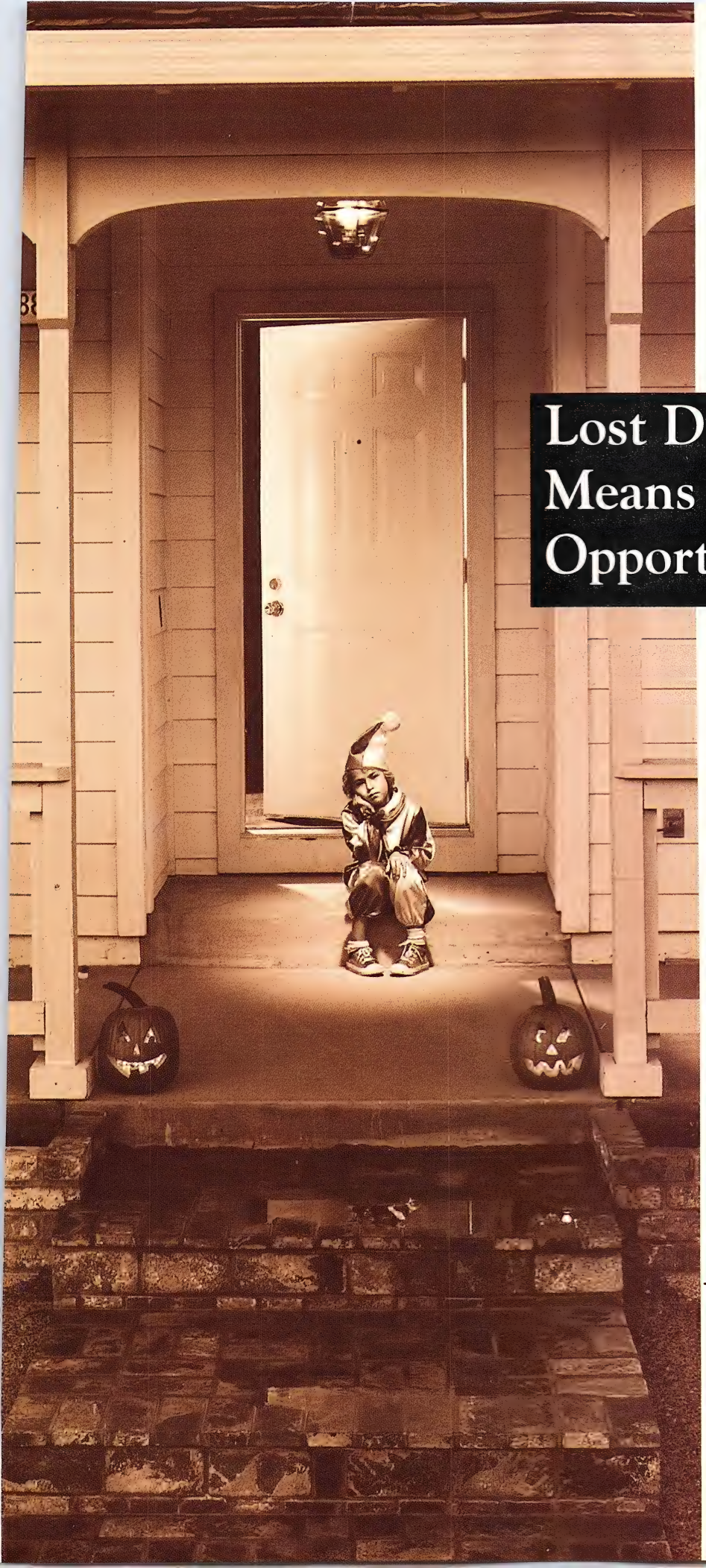
If you don't have enough RAM to implement the RAM disk strategy, or you worry that a power failure or kicked power cord will cause the RAM disk to lose all of your last edit session, you can use FDISK from DOS 3.30 or a later version to create a small partition on your hard disk as drive D:. Then use the method just described, substituting the hard drive D: partition for the RAM disk.

Tracking Down DEBUG

Q. *I'm a newcomer to computers and could use some help. A recent utility in* PC World *was created using a program called DEBUG. I have MS-DOS 3.20 and want to purchase a compatible version of DEBUG. The article mentions that DEBUG can be found on the DOS Supplemental Programs disk of DOS versions prior to 3.30 but fails to mention where to buy that disk. Would you please tell me where I can obtain it?*

Silas W. Downs
Columbus, Kansas

(continues)



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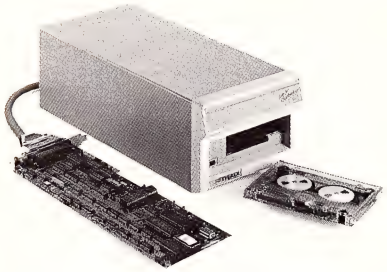

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A. You already have it. The DOS Supplemental Programs disk is the second disk included in your package of MS-DOS.

Racking My Brain

Q. *I work for a broadband local area communications network. We provide a lot of state-of-the-art electronic communications and video equipment mounted in racks (standard 19-inch width) to various clients. Many require rack-mounted PCs for system monitoring, and so I'm looking for the right one. However, I can't seem to find a rack-mountable PC anywhere. Can you help?*

Sharon Giudice
Lyons, Colorado

A. Texas Microsystems offers a nickel-plated-steel 19-inch-wide rack-mount unit, 7 inches high by 22 inches deep. The Model 3014 is equipped with two 8-bit and twelve 8/16-bit slots, five half-height drive bays, two fans to ensure proper cooling, and a 225-watt power supply. The company offers various hard disks that in combination can give you more than 1 gigabyte of storage within the 3014. High reliability, industrial-grade (NEMA Type 12) rack-mounted monitors and portable disk and tape drives are also available.

The 3014 is a passive backplane unit, meaning that there is no motherboard. Instead, you plug in a CPU card to run the system. Four CPU boards, which are based on Chips and Technologies chipsets and the Phoenix BIOS, are available. The B880, a 4.77-MHz 8088-based system board with 256K or 640K of on-board memory, costs $495 or $595, respectively. The $1295 B286-1 is a dual-speed (6/8-MHz or 6/10-MHz) 80286-based board with 1MB of on-board memory. The N286S/16-1 is a 16-MHz, near-one-wait-state 80286-based CPU board with 512K (expandable to 4MB on board) of RAM for $1595. It includes a socket for a 10-MHz 80287 coprocessor. The 80386-based B386 is available in 16-MHz and 20-MHz versions and can be configured with up to 16MB of on-board 32-bit memory, with prices starting at $1645 for a B386 with no memory installed.

The 3014 is inappropriate for general office use; it was designed for laboratory and clean-room environments. Generally sold to system integrators, the rack-mountable unit complements other Texas Microsystems products meant for the factory floor and ruggedized military applications. For example, the company recently introduced a solid-state "hard disk," the SSD, for environments where a hard drive can't be used. The SSD holds up to 20MB of battery-backed static RAM with an average access time of approximately .025ms.

Should repair ever be needed for any component of these solidly built systems, the company guarantees 48-hour turnaround time and will ship a replacement part if the device cannot be repaired within that time period.

WHERE TO BUY

Model 3014
Texas Microsystems, Inc.
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Houston, TX 77099
800/627-8700, 713/933-8050
List price: $1595
Warranty: one year parts and labor
Extended warranty: one additional year for 50 percent of the current list price of the repaired item
Technical support: unlimited, toll-free number, M–F 8–5
Other support services: none
For more information, circle 780 on reader service card.

Keep a Clean Head

Reading "Back on Track" from August's *Help Screen* reminded a few readers of their disk-reading problems. Dirty read/write heads are not the problem when a floppy drive can read its own disks but can't read a disk written by another drive; however, these readers felt I should mention that when a single drive has trouble reading disks, especially ones it wrote, the heads probably need cleaning. So done. Another reader noted that read problems also occur when the back of the monitor is too close to the disk drive of some systems.

To send correspondence or to submit material for publication in this column, please see How to Contact PC World, page 4.

POWER TIP NO. 20

Copy Two Files Into One

With the DOS COPY command, you can easily combine two ASCII files to create a third. For two files called List1 and List2, for example, just type COPY List1 + List2 List3. List3 will consist of List2 appended to the bottom of List1.

Joseph Irwin
St. Paul, Minnesota

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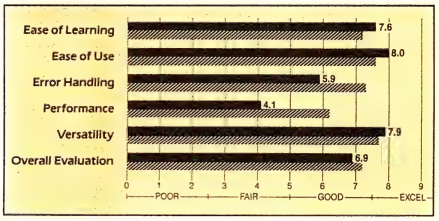

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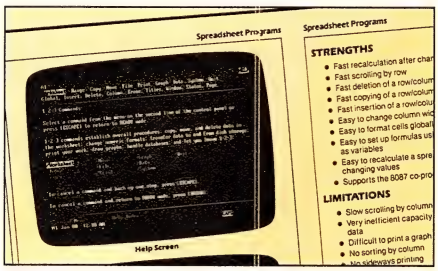

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> — **L.J. Callaghan**, Nabisco, Hanover, N.J.

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User-specified field placement	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Text placed anywhere on screen	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
VALIDATION												
Lookup validation		✓		P	P	✓	✓	✓	✓	P		✓
Lookup in another table		✓		P	P	✓	✓	✓	✓	P		✓
Range checking	✓	✓		✓	P	✓	✓	✓	✓	✓		✓
Validate by mathematical expression		✓		P	P				✓	P		✓
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★★★	7.7	PFS:Professional File	1.01	■	■	■	■	■	256K	$249	✓	✓	✓	22
★★★	7.2	PowerBase	2.3	■	■	■	■	■	384K	$349	✓	✓		24
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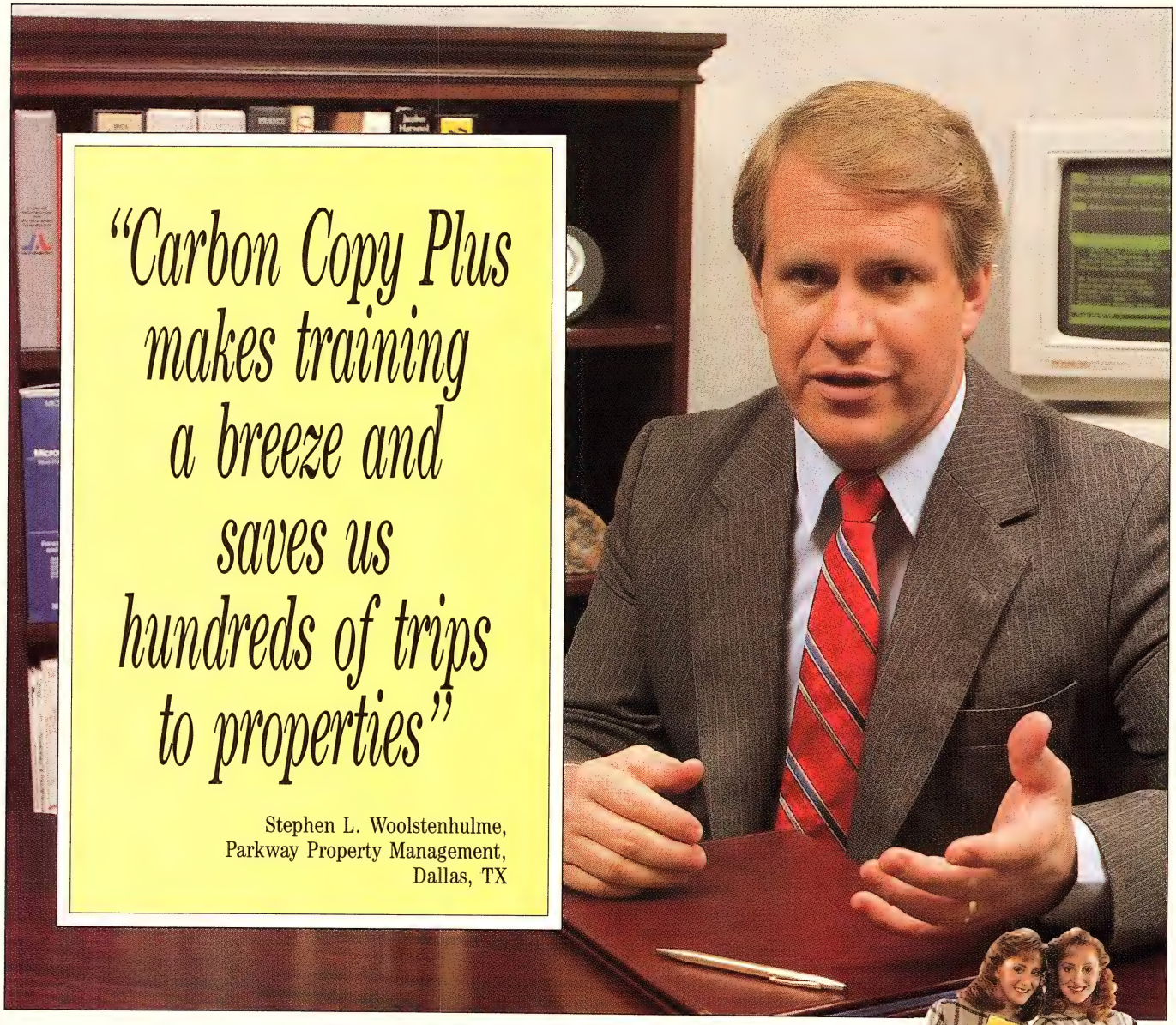

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Go wild with a Turbo C replacement for DEL, increase your AutoCAD comfort, simplify BASIC PRINTing, and check out three source-code analyzers.

Edited by Tom Swan

ANTHONY RUSSO

Oh, Those Wild Deletes

When using wild-card characters with the DOS commands DEL and ERASE to delete multiple files, you can easily erase more than you intend. For example, with the command DEL *.BAK, there's no way to delete only some files ending in .BAK. To DOS, wild-card file names like *.BAT or *.* are all-or-nothing affairs.

So I could delete specific files without giving up wild cards, I wrote a Turbo C program, DELVER.C (see **LISTING 1**), for DELete with VERify. Once you become familiar with DELVER, you may never use DEL/ERASE again.

As with DEL/ERASE, you can use DELVER to delete a single file (DELVER *filename.ext*) or to delete several files with similar names using a wild card specification, such as DELVER TEST???.*. But DELVER prompts you to answer Y before removing a file from disk. Press any other key, N or <Enter> for example, if you want to keep the file. DELVER will move on to the next file name.

Vincent D. O'Connor
Babbitt, Minnesota

Editor's note: To compile DELVER.C, start Turbo C and press **<Alt>-E** *to place the cursor in the Turbo editor window. After entering the program text shown in* **LISTING 1**, *press* **<Alt>-C** *to open the Compile menu. Then, select* Make *to create DELVER.EXE on disk. Quit Turbo C with* **<Alt>-X** *and copy DELVER.EXE to your disk's root directory or to any directory listed in your system's PATH command.*

AutoCAD in Comfort

AutoCAD's numerous commands make the program difficult to use, especially if you don't have a mouse. For more comfortable CAD sessions, I use ANSI.SYS to assign my most frequently used commands to <Alt>-*key* combinations. For example, <Alt>-P issues Plot; <Alt>-S, Save; and so on.

A batch file, ACAD.BAT [**LISTING 2**], makes the key assignments and then runs *AutoCAD*. Each of the ANSI.SYS key definitions begins with PROMPT $e[. Then come two numbers, each followed by a semicolon. The zero indicates an extended ASCII key such as a Function key, an <Alt>-*key* combination, <Insert>, <Cursor Up>, and so forth. The second number identifies the key [see **TABLE 1**]. For example, 0;37; is the code for <Alt>-K. [When defining a normal key, only one number, the key's ASCII code, is used.] Following the key code is the key's new definition, enclosed in double quotes. A single *p* ends the definition.

T. Sengupta
Bihar, India

(continues)

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```
/* delver.c, written by Vincent D. O'Connor */

#include <dos.h>
#include <dir.h>
#include <conio.h>
#include <stdio.h>
#include <ctype.h>
#include <process.h>

struct ffblk block;
char dir [MAXDIR], path [MAXPATH], drive [MAXDRIVE];
char ext [MAXEXT], file [MAXFILE];

void main (argc, argv)
   unsigned argc;
   char *argv [];

{
   if (argc != 2) {
      printf ("\aInvalid number of parameters\n");
      exit (1);
   }

   fnsplit (argv [1], drive, dir, 0, 0);

   if (findfirst (argv [1], &block, 0)){
      printf ("\aInvalid path or no matching files");
      exit (1);
   }

   do {
      fnsplit (block.ff_name, 0, 0, file, ext);
      fnmerge (path, drive, dir, file, ext);
      printf ("\nDelete %s? ", path);
      if (toupper (getche ()) == 'Y')
         if (unlink (path))
            printf ("\aError while attempting deletion");
   } while (!findnext (&block));

   exit (0);

}
```

LISTING 1: This Turbo C program, DELVER.C, prompts you for verification before deleting files from a disk.

Editor's note: Before running ACAD.BAT, check that ANSI-.SYS (from your DOS disk) is in the hard disk's \DOS directory and that CONFIG.SYS contains the line DEVICE=C:\DOS-\ANSI.SYS. Whether or not you use AutoCAD, *you can employ this same technique to add keyboard macros to other programs, but only if the software uses standard methods for reading the keyboard. Programs that access the keyboard directly may not recognize the ANSI.SYS key assignments.*

You can also use this technique to create limited DOS macros. For example, I include the line PROMPT $e[0;66; "Exit";13p in my AUTOEXEC.BAT file, assigning Exit plus <Enter> (ASCII 13) to <F8>. This lets me temporarily exit to DOS, as many current programs allow, and then press <F8> to quickly return to my work. Note that key definitions can contain a mix of quoted text and ASCII codes.

(continues)

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```
prompt $e[0;25;"plot"p
prompt $e[0;19;"redraw"p
prompt $e[0;31;"save"p
prompt $e[0;20;"text"p
prompt $e[0;22;"undo"p
prompt $e[0;44;"zoom"p
prompt $e[0;30;"arc"p
prompt $e[0;46;"copy"p
prompt $e[0;32;"dim"p
prompt $e[0;18;"erase"p
prompt $e[0;48;"block"p
prompt $e[0;33;"fillet"p
prompt $e[0;34;"grid"p
prompt $e[0;35;"hatch"p
prompt $e[0;23;"insert"p
prompt $e[0;38;"line"p
prompt $e[0;50;"move"p
prompt $e[0;16;"quit"p
prompt $p$g
c:
cd c:\acad
acad
```

LISTING 2: ACAD.BAT assigns frequently used commands to <Alt>-key combinations before running AutoCAD.

What You See Is What You Print

In BASIC, it isn't always convenient to use PRINT and LPRINT to output text to the screen and the printer. For instance, while debugging, I often need to test printer output by temporarily changing LPRINT statements to PRINT, a tedious and time-consuming job when you have hundreds of such statements to edit.

Recently, I found a more convenient way to accomplish the identical task: Use OPEN and PRINT # (instead of PRINT and LPRINT) for all output. With this method, the statement OPEN "LPT1:" FOR OUTPUT AS #FN directs PRINT # statements such as PRINT #FN, "ABCDEFG" to the printer, in exactly the same way LPRINT does. Similarly, OPEN "SCRN:" FOR OUTPUT AS #FN directs output to the screen. The variable *FN* can be any number from 1 to 255.

REDIRECT.BAS [**LISTING 3**] demonstrates the technique and shows how to redirect PRINT output with simple assignment statements to variables BUFPRT, BUFSCR, and BUFOUT, which also help make the code easy to read. Best of all, I can now print anything I can display without editing a single PRINT or LPRINT statement.

Richard C. Baxter
Wilton, Connecticut

DEVELOPER'S TOOLBOX

The Electric Source-Code Acid Tests

Lately, I've been getting a helping hand from three source-code analyzers: *PC-Metric*, *Turbo An-*

(continues)

ASCII Code	Extended Key
16-25	<Alt>- Q, W, E, R, T, Y, L, I, O, P
30-38	<Alt>- A, S, D, F, G, H, J, K, L
44-50	<Alt>- Z, X, C, V, B, N, M
59-68	<F1> through <F10>
84-93	<Shift>-<F1> through <Shift>-<F10>
94-103	<Ctrl>-<F1> through <Ctrl>-<F10>
104-113	<Alt>-<F1> through <Alt>-<F10>

TABLE 1: Extended ASCII codes for ANSI.SYS reassignments of function key and <Alt>-key combinations

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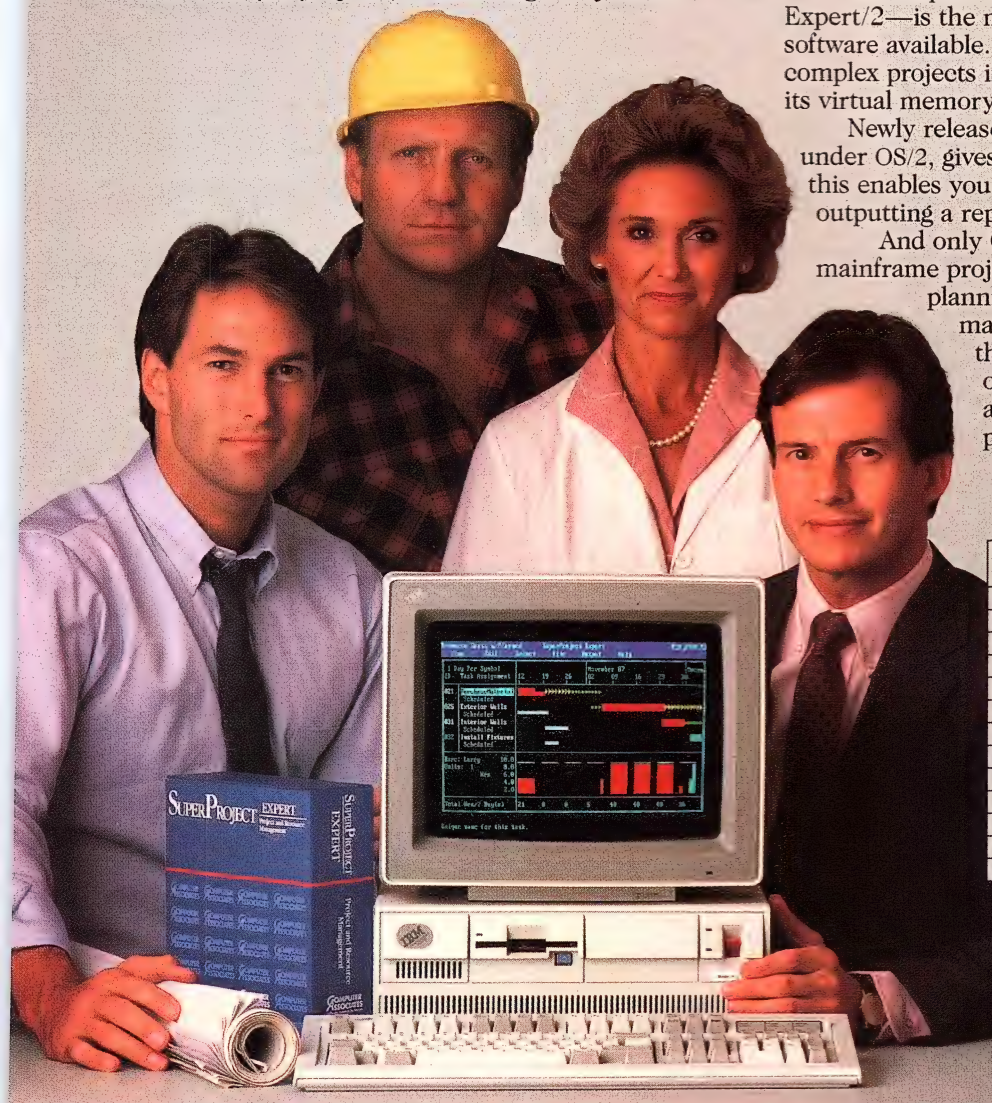

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```
100 BUFPRT=1
110 BUFSCR=2
120 BUFOUT=3
130 OPEN "LPT1:" FOR OUTPUT AS #BUFPRT
140 OPEN "SCRN:" FOR OUTPUT AS #BUFSCR
150 CLS
160 LOCATE 10,10
170 INPUT "SELECT PRINTER (P) OR SCREEN (S) FOR OUTPUT ", ANS$
180 IF ANS$="P" OR ANS$="p" THEN BUFOUT = BUFPRT
190 IF ANS$="S" OR ANS$="s" THEN BUFOUT = BUFSCR
200 IF ANS$<>"P" AND ANS$<>"S" THEN GOTO 150
210 PRINT #BUFOUT, "These two lines can go either to the printer or
220 PRINT #BUFOUT, " to the screen by defining BUFOUT at run time."
230 PRINT #BUFPRT, "This line is always printed."
240 PRINT #BUFSCR, "This line is always displayed on screen."
250 BUFOUT=BUFPRT
260 PRINT #BUFOUT, "These lines are redirected to the printer"
270 PRINT #BUFOUT, " by making BUFOUT equal to BUFPRT."
280 BUFOUT=BUFSCR
290 PRINT #BUFOUT, "These lines are redirected to the screen"
300 PRINT #BUFOUT, " by making BUFOUT equal to BUFSCR."
999 END
```

LISTING 3: REDIRECT.BAS demonstrates how to use PRINT statements to direct output to either the printer or the display.

alyst, and *AsmFlow*. These programming tools provide a battery of acid tests to analyze, profile, and document my source code in ways I've never been able to accomplish before.

If programming is an art, *PC-Metric* is a state-of-the-art critic. I use the Pascal and C versions, but COBOL, Modula 2, and FORTRAN packages are also available. Working with most modern compilers, *PC-Metric* reads a source-code text file and applies scientific formulas to a program's logic.

As a test, I fed *PC-Metric* a 1700-line module from my Turbo Pascal data base system. About 30 seconds later, on a 16-MHz ALR 386/2, I received two reports: a chart of statistics and a text file advising me whether each procedure and function falls within recognized standards of excellence.

The statistics include: total and unique operators and operands, length versus predicted length, purity ratio, volume, effort, cyclomatic complexity, estimated errors, and others. Obtaining these values is the easy part. Understanding how to apply the evaluations requires a careful reading of the tutorial, which explains the theory behind each variable. A bibliography lists related books and articles. If I can ever find the time, I'd love to read them all.

For immediate help in using *PC-Metric* statistics, a supplied utility converts report files to comma-delimited ASCII text for loading into *dBASE*, *1-2-3*, or *Quattro*. After loading my test data, I ran an included macro to graph the results in pie and bar charts. Immediately I spotted a procedure that was doing more than its fair share of the work and made a note to divide the code into several smaller modules. Perhaps I could have drawn this conclusion directly from the program text, but the graph grabbed my attention and gave me a new way to evaluate my work.

(continues)

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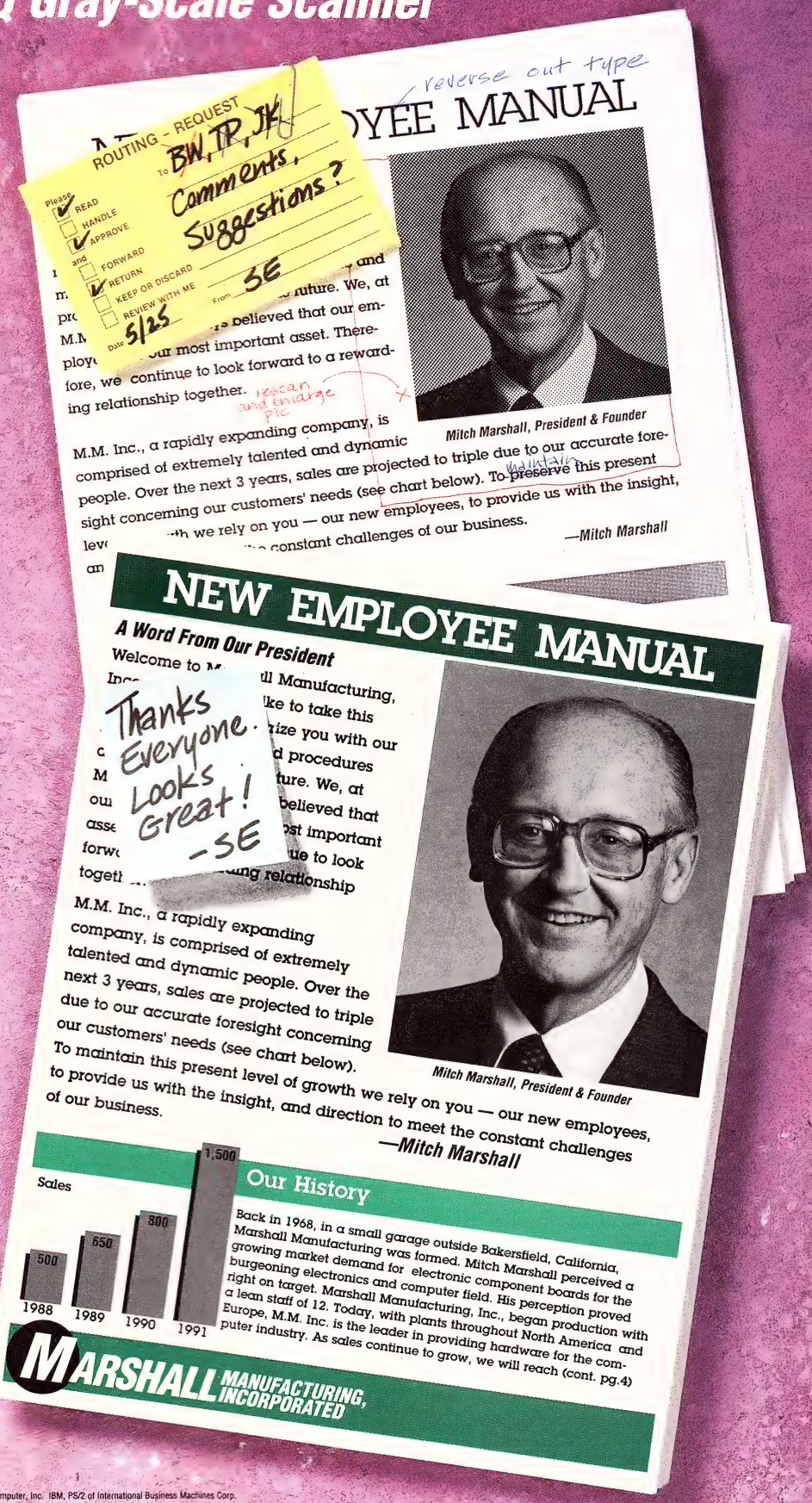

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PC-Metric statistics offer other practical applications that may not be obvious. For example, instead of bidding a source-code maintenance job by the line, as many consultants do, you could run a 10,000-line C program through *PC-Metric* and calculate your fee based on the program's complexity.

PC-Metric is also useful in allocating testing time. I can quickly identify the more complex and error-prone modules in a program and concentrate my testing there, on the theory that bugs are more likely to show up in the trickier sections.

Another analytical tool, *Turbo Analyst 4.0*, is strictly for Turbo Pascal programmers. Kim Kokkonen of TurboPower Software isn't charging enough for this wonderful set of source-code tools. On four disks are two execution profilers, a program structure analyzer, a program lister, and a Pascal formatter, which can stylize even the messiest source-code jumble. In addition to a few other goodies, most of the source code is included. (The missing text is available in other products from the same company.)

Of all the tools in the *Turbo Analyst*, the most useful in my work are the two execution profilers. In fact, after trying them I abandoned a similar profiler I was planning to write. I know when I've been beaten.

A profiler can help inject extra speed into a program. The profiling software sits in memory while your program runs. After you quit the program, the profiler reports how much time was spent executing various sections of code, identifying the most heavily traveled paths. Because most programs spend about 90 percent of the time in only 10 percent of the code, optimizing the time-critical sections in superfast assembly language often generates nearly as much speed as you could expect from rewriting the entire program. A good profiler can pay for itself on first use.

In addition to the profilers, the *Turbo Analyst*'s Pascal structure analyzer locates duplicate identifiers, prints a procedure hierarchy chart and index, warns about unused symbols, and reports on possible side effects. (Side effects can occur when functions change global variables, a poor practice and a prime source of bugs.)

For assembly language programming, I came across another analytical tool, *AsmFlow*, a program that deserves better exposure. *AsmFlow* reads Assembler source code, calculates CPU timings (invaluable for optimizing code), displays and prints flow charts, and summarizes stack usage, registers, and unused external symbols.

A unique feature marks the closest instruction affecting a conditional jump. If you've ever used the wrong jump instruction, accidentally testing the overflow instead of the carry flag, for example, you'll appreciate this feature.

At the touch of a few keys, *AsmFlow* can also generate a list of procedures called by other procedures. Revising such "called-by" lists at the top of each module is one of those necessary assembly language documentation chores that I loathe doing by hand.

After years of testing, analyzing, and documenting my source code the hard way, I now have the software tools I need to put my programs to the test. *PC-Metric*, *Turbo Analyst*, and *AsmFlow* are on my hard disk to stay. —*Tom Swan*

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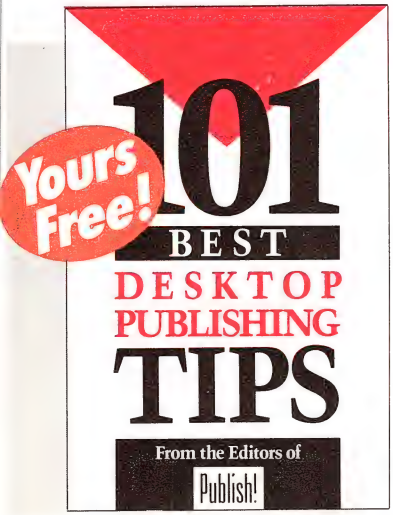

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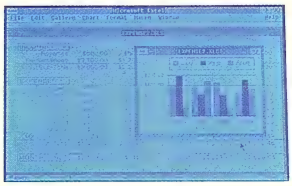

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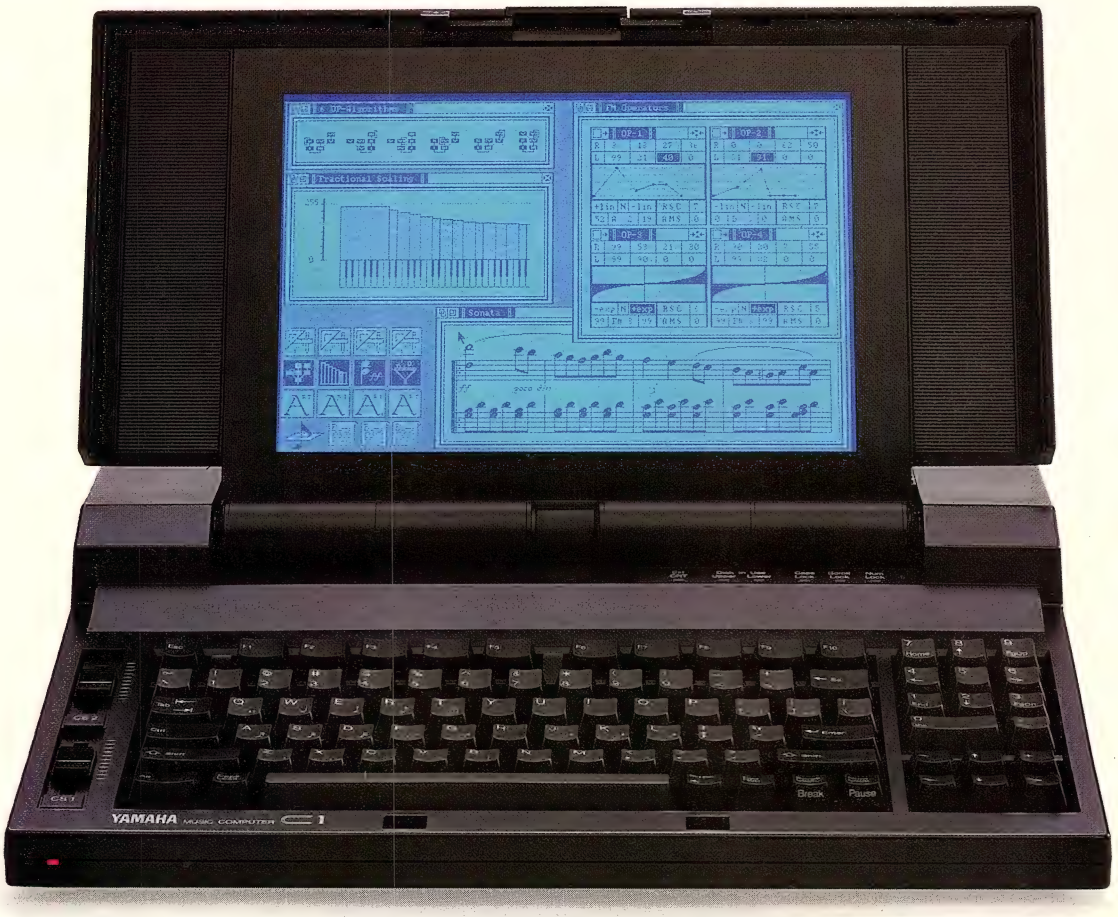

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Circle 273 on reader service card

The Catacombs of OS/2

OS/2 achieves its multitasking might through a grid of back routes and pathways.

Here's a short course on the rules of the road.

FRED STIMSON

Robert M. Carr

When all is said and done, OS/2 is about one thing: multitasking. Its heralded attributes—a vast 16MB of memory-address space and the ability to tap 286 hardware-protected memory—are simply means to that end.

In good time OS/2 will transform the PC into a host for a suite of full-fledged applications, from heavyweight spreadsheets and data managers to lighter-weight utility software, such as to-do lists and time managers.

But OS/2 is hardly the first product capable of running more than one program at a time. DOS-based operating environments like *Windows 2.0*, *Windows/386*, Quarterdeck's *Desqview*, and Tandy's *DeskMate* can legitimately juggle several applications at once.

The OS/2 advantage is true preemptive multitasking. That is, OS/2 permits numerous properly written applications to reside (and operate) safely within the machine while each appears to be living solo.

Don't be fooled by OS/2's "single user" status; as befits a minicomputer-style operating system, OS/2 is a master at communication—it's simply negotiating tasks rather than users.

OS/2's internal tricks and techniques may be invisible to you, but they won't be to your OS/2 application. Under OS/2, that application will intrinsically be more capable, more communicative, and more respectful of coresident applications than its DOS predecessor.

Raising the Flag

OS/2's sophisticated internal techniques, collectively called interprocess communications (IPC), make the multitasking wheels spin while they ensure data integrity. The IPC storehouse includes shared memory, semaphores, pipes, queues, and a *Windows* technique called dynamic data exchange (DDE).

Whenever multiple programs or tasks within one program share the same information, they must coordinate data access. Under OS/2 the fundamental apparatus for sharing access to data is the semaphore. Semaphores provide a fast means of data locking, typically for in-memory data. They operate as flags or streetlights governing each application's access to shared data and limiting write access to files. Semaphores are necessary simply because altering shared data in a random way is ruinous; my edits to a file could well wipe out your edits.

By convention, each application must check the semaphore

(continues)

before proceeding. In the event of a conflict, the application must wait before rechecking. Even with a green light, an application must be well behaved, notifying OS/2 when its work is completed. The semaphore can then change its value and grant access to another application.

Semaphores exist because data shared among multiple tasks is as prone to problems as data siphoned through multiple users. But data not shared in one location needn't be guarded, although it may need to be copied or sent from one process to another. That's where the other forms of interprocess communications come in.

Sharing Pipe Dreams

OS/2 generally assumes that applications must be carefully insulated from each other, and it relies on the 286's protected-mode hardware to physically prevent one application from accessing memory reserved for another. But OS/2 does provide a trapdoor for cooperative applications, where "trust" has been established. That escape hatch is termed *shared memory.*

With shared memory, an application requests that OS/2 temporarily drop the memory barriers for specified programs. Sharing memory makes sense for separate processes within an application, or for applications written to work together—particularly if they need to exchange large amounts of data while conserving RAM and maximizing speed.

You might regard pipes, queues, and DDE as OS/2's answer to the Postal Service. These three vehicles deliver one application's packet of data to another application.

Pipes come in two flavors: anonymous and named. Anonymous pipes are commonly used within one application for internal multitasking. Named pipes are connections that enable applications on separate PCs to communicate directly and exchange information, wherever they reside.

Pipes can be used as speedy conduits to link background processes—a technique sometimes called pipelining, because several pieces of code can work on the data in parallel. Pipe data is stored only in RAM buffers, not on disk. Furthermore, pipe data can be accessed only in the order it is written in—on a first-in, first-out basis.

Named pipes follow the naming conventions of PC files: applications need only know a pipe's name to access it. When OS/2 does include named pipes, it will deliver messaging capabilities roughly equivalent to a post office that can address every letter itself. With such power, named pipes will most frequently be included in applications that provide a service to a number of clients simultaneously—mail and data base servers, for example.

Like named pipes, queues provide messaging communications between applications. Unlike named pipes, queues use shared memory within a single PC to communicate between applications. Message passing is quick because messages need not be copied, but queues operate only within one PC, implementing hot link relationships.

One if by Land, Two if by DDE

These messaging techniques are included within OS/2 or will be in due course. But once a message is passed from one application to another, how does the program decipher it? How does a program determine whether the corresponding application is requesting data or sending it? And in what format?

OS/2 itself doesn't provide the answers, but the Presentation Manager does, thanks to DDE. DDE is not a delivery technique but a formatting and writing convention that describes the layout and meaning of messages passed via pipes and queues.

DDE enables an application to inform coresident applications of data changes. The classic example of DDE in action involves the receipt and dissemination of stock quotes among a communications program like *Lotus Signal*, a spreadsheet, and a market analysis package.

It's clear that OS/2 and the Presentation Manager offer an array of technologies that enable applications to communicate well beyond the scope of DOS 3.*xx* or any DOS-based environment. Although the software development community will need time to fully probe these capabilities, users will emerge the clear winners. We'll be able to follow building-block strategies, assembling software suites in which the whole far exceeds the sum of the parts.

OS/2's rich IPC techniques alone endow OS/2 applications with functionality you can be sure that canny developers will exploit. Such promise suggests that the transition to OS/2 may be surprisingly painless—perhaps even pleasant. ●

Robert M. Carr is the creator of Framework II *and cofounder of Go Corporation, a software start-up.*

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THIRD ANNUAL ANDREW FLUEGELMAN AWARD 1989

III

Call for Nominations

PURPOSE

The Andrew Fluegelman Award is given annually to encourage personal computer software excellence and to recognize a software programmer or team of programmers. We are looking for people who have made a substantial, innovative contribution to the personal computer community in commercial, shareware, or public-domain software.

The award was established in 1986 by PCW Communications to commemorate Fluegelman's contributions to the software field. Fluegelman developed PC-Talk, the first easy-to-use and powerful communications program for the IBM PC. His concept of freeware remains one of the most innovative means of sharing and marketing software. Fluegelman died in July 1985, and a fund was established in his name. The annual award, sponsored by PCW Communications and the Software Publishers Association, is made possible through the Andrew Fluegelman Fund.

ELIGIBILITY

Any commercial, shareware, or public-domain personal computer software –including utilities, applications, and languages–developed by an individual or a team is eligible. The program must have been released between January 1, 1985, and December 31, 1988. Nominations can be submitted by anyone who did not participate in the software's development. Companies are encouraged to submit nominations for software that they market; but only individuals, not companies, are to be nominated.

PRIZE

The award winner will receive $5000 and a commemorative plaque. The award will be presented at the Software Publishers Association annual awards dinner in March 1989.

JUDGING

Each program will be evaluated according to the following criteria:

*It advances the state of the art of personal computing.

*It manifests innovation in concept and design.

*It demonstrates orientation to personal computer users.

SELECTION OF WINNERS

The award recipient is selected in a two-step procedure. First, an independent screening committee will review nominations and select the finalists.

Second, a panel of judges will evaluate the work of the the finalists. From these, an award recipient will be selected.

PROGRAM COPIES

Finalists will be asked to submit six copies of their program for the judges' evaluation. These will be returned after judging. Please do not send programs until you are notified that you are a finalist.

1989 Andrew Fluegelman Award Nomination Form. Please type your entries; no handwritten entries will be accepted. Attach additional pages with a brief description of program (100 words or less!) and the reason for your nomination.

Name of program: _____ Creator (if more than one, designate team leader): _____

Software marketer: _____ Release Date: _____

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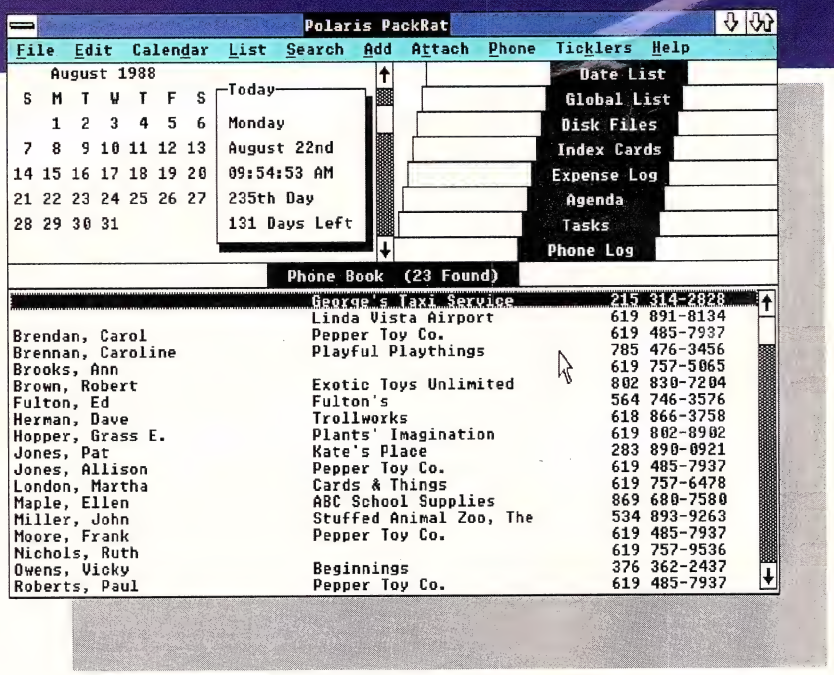

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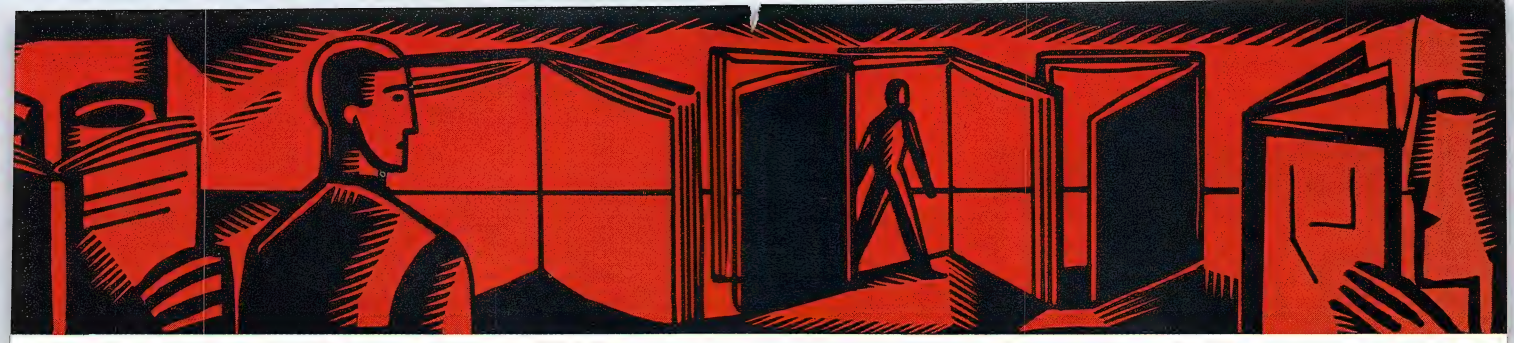

SOURCEBOOKS

Further explorations into personal computer technology

A CompuServe guru guides you through the on-line maze, and two specialists on productivity tell how to manage knowledge workers.

Michael Harper
and
Marlene Nesary

ANTHONY RUSSO

On-Line Savvy

Alfred Glossbrenner's Master Guide to CompuServe
Alfred Glossbrenner
Brady/Prentice Hall Press, New York, 1987
432 pages
$19.95 softcover

Alfred Glossbrenner is a walking encyclopedia of PC communications know-how. His 12th book, *Master Guide to CompuServe*, provides a comprehensive survey of this granddaddy of general-interest information and communications services. Whatever your primary concern—investment information, games, electronic conferencing, research—the *Master Guide* can help you hack a path through CompuServe menus and commands.

Fully one-third of the *Master Guide* is devoted to accessing and using the wealth of business and financial information available on CompuServe, which Glossbrenner claims is second only to Dow Jones News/Retrieval in this realm. "There's so much valuable material scattered through the system," he writes, "that it's easy to miss out if you don't have a plan of attack." Glossbrenner has one, and he gives a hands-on demonstration of strategies for exploiting CompuServe's business news, information, expert advice, and tips.

His densely packed pages reveal lots of consumer savvy, too. For example, getting the name and address of a company through one CompuServe data base, Disclosure II, will cost you $2.30, but you can obtain it for a mere two bits using Standard & Poor's data base.

Retrieving information from this well-organized guide is often a delight. Glossbrenner's discussion of the on-line *Academic American Encyclopedia* notes that the service "is enormously popular among elementary and high school students....the AAE makes it easy to research a topic in the detail acceptable at the elementary and secondary level ...and to quote key passages without the need to retype anything."

Spend a little time reading Glossbrenner's book and you're likely to save big bucks on connect time. Browsing also has its rewards, since it points out services you may not be aware of. Whether you already subscribe to CompuServe or are just considering it, you'll appreciate Glossbrenner's inside tips.

(continues)

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Bossing Brains

Peopleware: Productive Projects and Teams
Tom DeMarco and Timothy Lister
Dorset House, New York, 1987
188 pages
$23 softcover

If you hire people for their brains, you can't treat them like modular components and expect an able, creative crew to emerge. That's the basic message in *Peopleware: Productive Projects and Teams*, a cogent little book written by Tom DeMarco and Timothy Lister, two consultants whose specialty is "knowledge worker" productivity.

Between them the two authors have over 30 years' experience with such companies as American Express and Hewlett-Packard. They use this experience to describe the "puzzle of keeping good people," and the intriguing, sometimes exasperating process of team building.

DeMarco and Lister tell a subtle story to illustrate the all-important jelling process: Workers assigned to a new project are invited to a preproject get-together at the manager's home, where they wind up pitching in with everything from shopping to dishwashing at an apparently impromptu spaghetti dinner.

"Nobody takes charge.... There is some talk of making a clam sauce, and when nobody's opposed, two of your new mates begin to talk out the details.... Your boss gives no direction, but she pitches in to chop onions when someone suggests that's what's needed....Gradually a dinner comes together."

What does this laid-back style have to do with the bottom line? Everything, say DeMarco and Lister. "You have to look twice to see the manager's hand in any of this...but you've just had your first success as a group. Success breeds success, and productive harmony breeds more productive harmony."

Though a spaghetti dinner might not cost the company anything, some of DeMarco and Lister's recommendations will. They've studied the correlations between productivity and environment for ten years, and make a strong case for large, quiet offices. "Police-mentality planners design workplaces the way they would design prisons: optimized for containment at minimal cost." This is false economy, argue the authors. "As long as workers are crowded into noisy, sterile, disruptive spaces, it's not worth improving anything *but* the workplace."

If your firm can't afford larger premises, at least it can ensure more worker privacy by providing "a quiet little cubbyhole with two large folding tables and a door that shuts," instead of an "EZ-Whammo Modular Cubicle with seventy-three plastic appurtenances." Quiet can be secured by deep-sixing the electronic paging system and doing something about the phones. (Their tip: stuff the bells with tissue.)

Peopleware is fun to read because the authors illustrate their analyses and solutions with war stories drawn from their consulting experience. But this well-researched book is also persuasive because its advice is backed up by firm scholarship. —*M. H.*

(continues)

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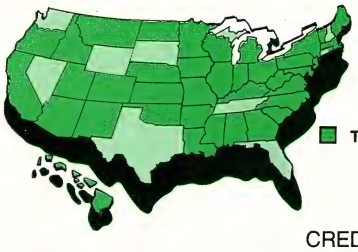

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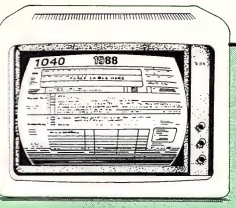

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BOOKS IN BRIEF

There's only one LaserJet bible, and now it's been updated. Written by Ted Nace and Michael Gardner, *LaserJet Unlimited, Edition II*, covers everything from LaserJet origin myths to running the LaserJet with a Mac. Along the way you'll learn how to speak in tongues (the arcane printer control language); compress print time using memory cards and PostScript controllers; find, download, and use fonts; and run the LaserJet effectively with the latest word processing, spreadsheet, data base, and desktop publishing software. Make this bargain book your first LaserJet add-on. $24.95, Peachpit Press, Berkeley, California, 1988; 512 pages, softcover.

Word guru Peter Rinearson has a new offering. A palm-size, action-oriented guide to version 4.0, *Microsoft Word for the IBM PC* is organized by task rather than by command or menu structure—a boon for those (not us, of course) who forget command names or the menu location of esoteric operations. Concise paragraphs explain tasks both simple and complex. You'll find useful directions for creating multiple columns, sorting paragraphs, merging master and data documents—even quitting *Word*. Especially handy are the appendix's short command summaries for entering and editing text and for moving around within a document. It's well worth the $5.95. Microsoft Press, Redmond, Washington, 1988; 122 pages, softcover. —*M. N.*

Michael Harper teaches English at Scripps College in Claremont, California. Marlene Nesary is an assistant editor for PC World.

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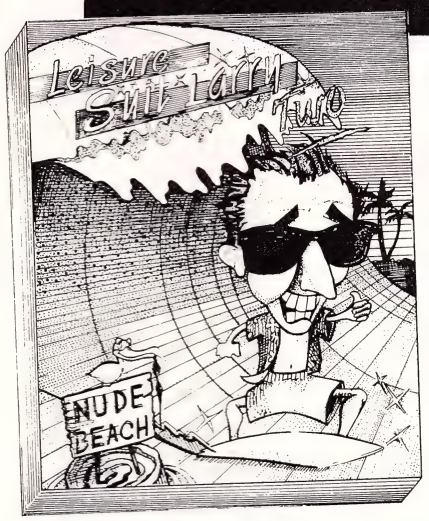
Help Larry Get "Lucky"



For all of you who helped Larry get "Lucky" in *Leisure Suit Larry's* original PC game, you're in for a real surprise with his new worldwide adventure. For those who have not met Larry — hang on!

We meet Larry in L.A., left penniless (except for a torn one dollar bill) by his latest fling. Of course, Larry is nobody's fool. He immediately takes his last remaining $1 bill and plays the state lottery. Luck is with Larry — he wins and is invited to participate in the "Big Spin". Larry wins millions and is immediately a very popular "Dude".

But wait! Behind this beach blanket of fun and frivolity lies a ballyhoo of espionage and intrigue. With KGB agents, the Hairy Krishnas, and dozens of "available" women on his tail, Larry's good fortune could vanish quicker than his hairline!!

Dance, party, and chase the Babes — that's Larry's motto!! But with all the swinging times you'll have, *Leisure Suit Larry II* is also a very challenging adventure game that will test your street smarts to the fullest. Larry is not exactly the most polished Playboy around. After all, who else but Larry would wear tennis shoes with his polyester suit, cut his hair so short that you see his "whitewalls", or tell the girls that his new colored contacts are the "real thing" — let's all help Larry!

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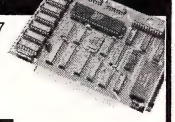

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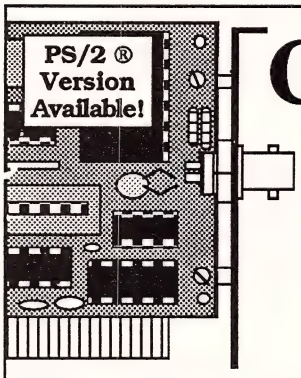

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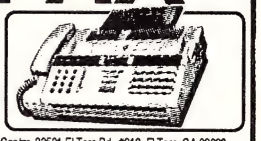

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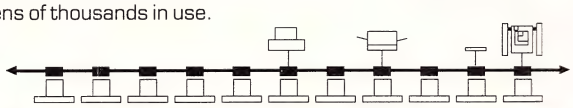

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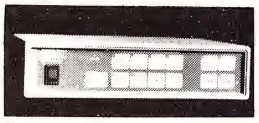

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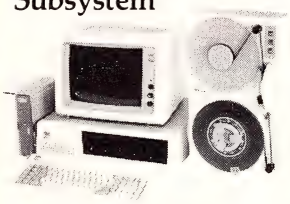

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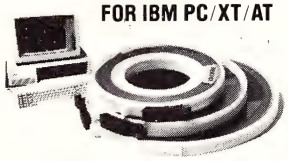

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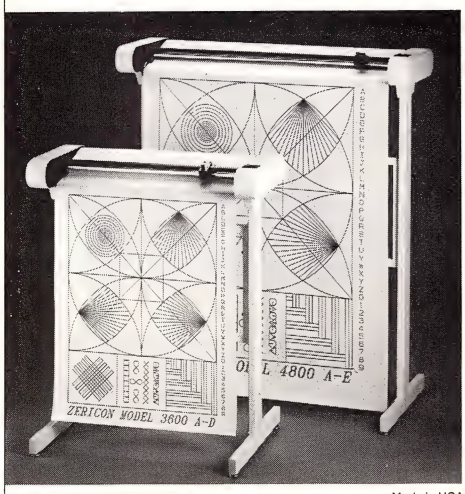

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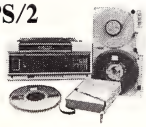

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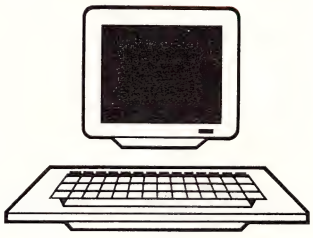

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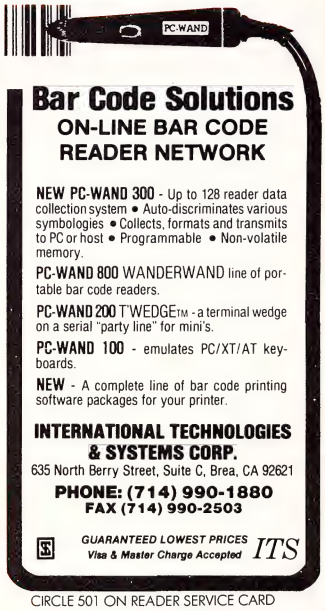

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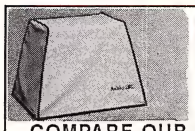

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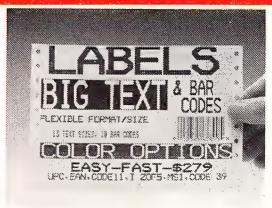

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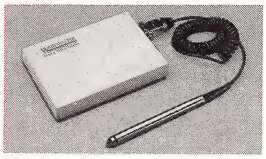

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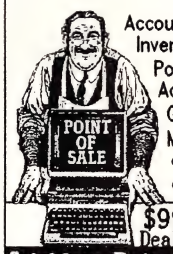

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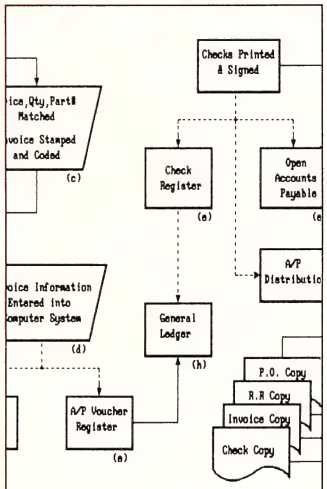

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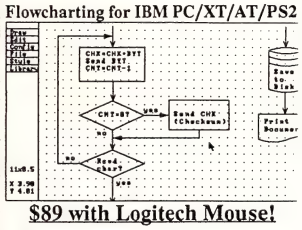

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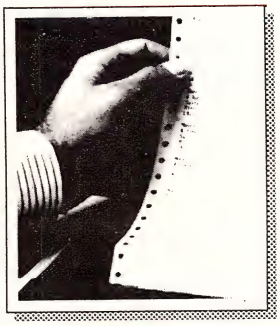

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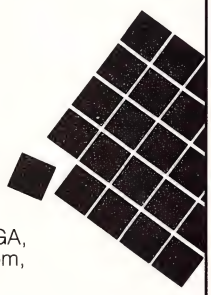

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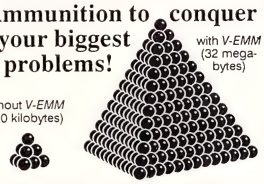

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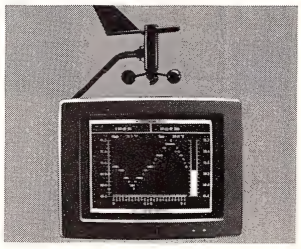

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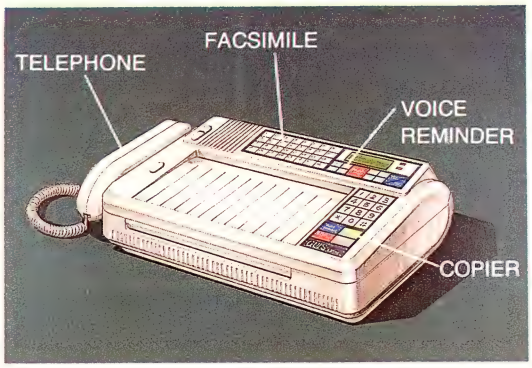

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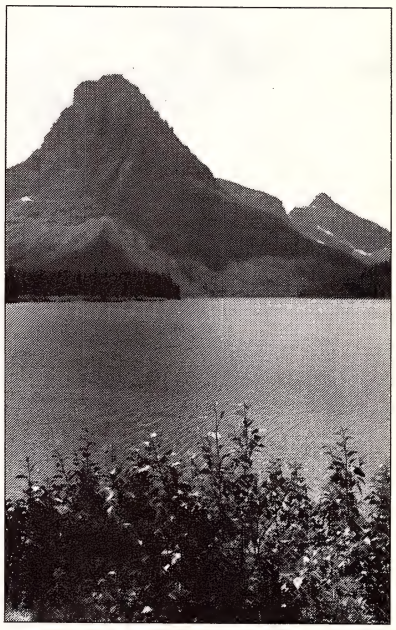

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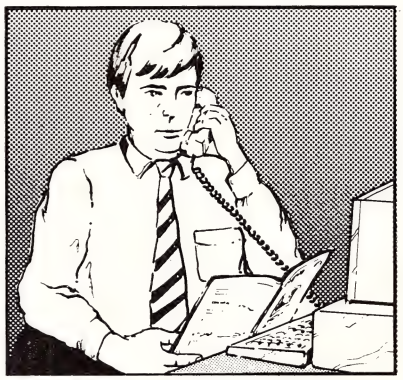

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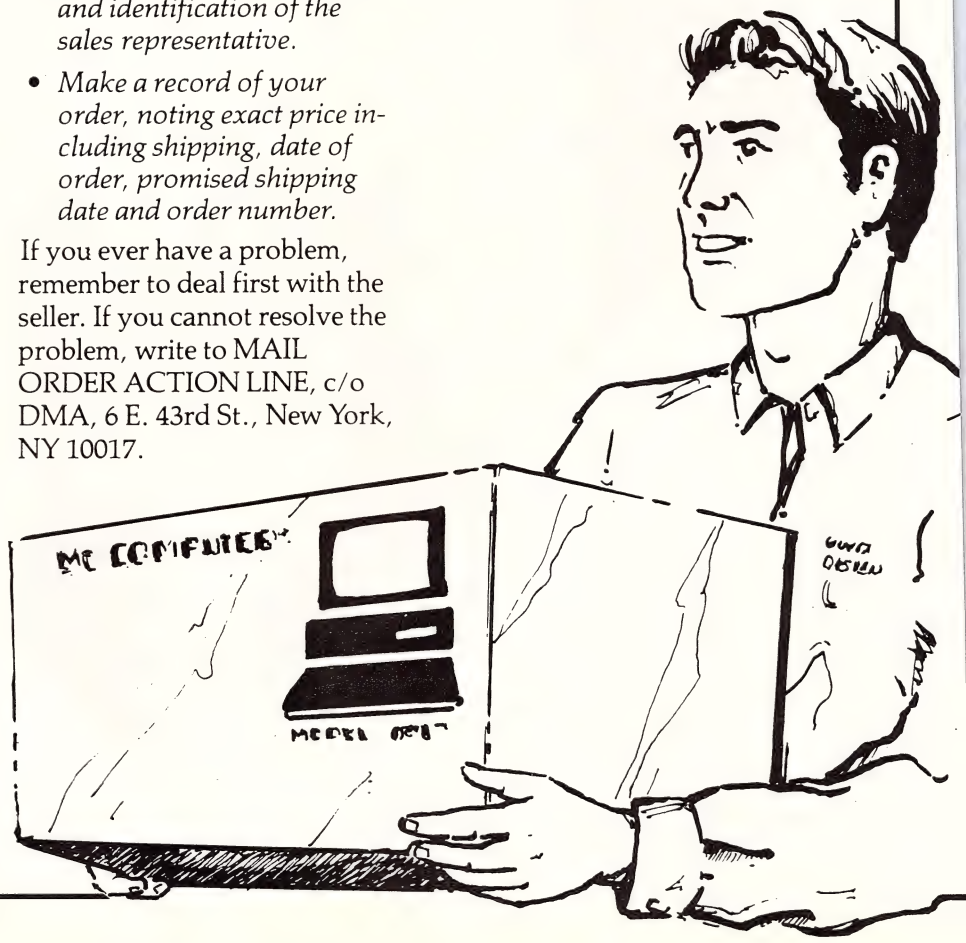

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Magnavox RGB (640x200)	$249
NEC Multisync II	$595
Princeton Max 12	$149
Princeton HX 12	$419
Princeton HX 12E	$449
IBM Mono 8503	$199
IBM Color Display 8512	$449
IBM Color Display 8513	$525
IBM Color Display 8514	$1,150
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Samsung Amber TTL Mono	$79
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Samsung 14" Multisync	$429

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Star NX-1000	$169

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Everex 2400 Internal	$149
Everex 2400 External	$199
Hayes 1200 Internal or External	$269
Hayes 2400 Internal or External	$419
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Practical 1200 External	$149
Practical 2400 Internal	$159
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Please note: because of today's volatile market and the early deadline for submitting this ad to the publisher, prices are subject to change. In many cases, prices will be lower.

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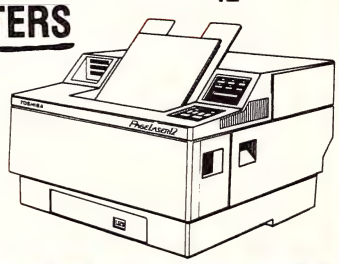
TOSHIBA PRINTERS

PageLaser 12



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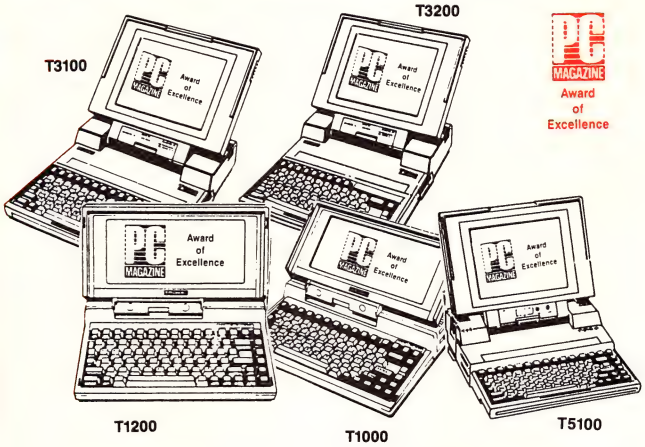

T1000

- 512K memory standard
- One 3.5″ 720KB floppy
- Sharp clear supertwist LCD display (640x200)
- MS-DOS 2.11 in RAM
- Options include numeric keypad, 1200 bps Hayes compatible modem, memory expansion card.

T1200

- 1 MB memory standard
- 9.54 or 4.77 MHz operating speed
- One 3.5″ 720 KB floppy, one 20 MB hard drive
- Sharp clear supertwist LCD display (640x200)
- RGB color and monochrome monitor connector
- Parallel, serial, and floppy drive port
- Full-size 82-key keyboard
- MS-DOS and SideKick

T3100

- 640KB memory standard—expandable to 2.6MB
- One 3.5″ floppy, one hard drive
- High-resolution gas plasma display (640x400)
- Parallel, serial, and external floppy drive ports
- RGB color monitor connector
- Full-size 81-key keyboard with a big-machine feel.
- MS-Dos 3.2 and Basic

T3200

- 1 MB memory standard expandable to 4 MB
- 80286 CPU running at 12 MHz
- One 3-1/2″ floppy, one 40 MB hard drive
- High resolution gas plasma display
- Parallel, serial and external floppy drive ports
- EGA color monitor connector
- Full function 85-key keyboard with port for 101-key keyboard
- MS-DOS 3.2

T5100

- 2 MB memory standard expandable to 4 MB
- 80386 CPU running at 16 MHz
- One 3-1/2″ floppy, one 40 MB hard drive
- High resolution gas plasma display
- Parallel, serial and external floppy drive ports
- EGA color monitor connector
- Full function 82-key keyboard with port for 101-key keyboard
- MS-DOS 3.2

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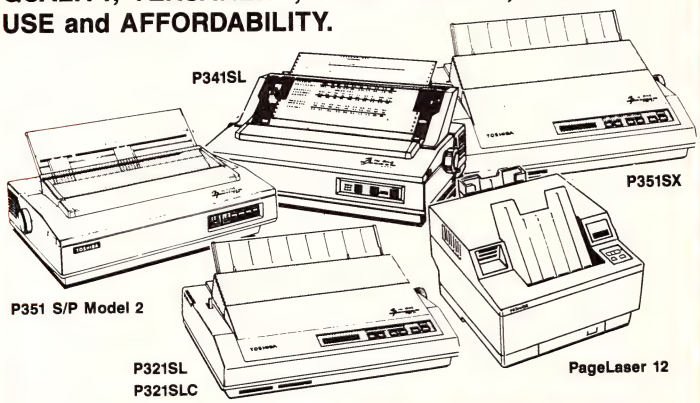

P321SL

- 216 cps Draft; 72 cps Letter Quality
- 180x360 Graphics Resolution
- IBM Pro-printer compatible
- Front Panel Controls
- Built-in Tractor Feed
- Fan-fold Bypass for single sheet handling w/autoload
- 32KB memory for Buffer or Downloadable Fonts
- Credit-card size snap in fonts

P321SLC

- **Full Color Capability**
- 216 cps Draft; 72 cps Letter Quality
- 180x360 Graphics Resolution
- IBM Pro-printer compatible
- Front Panel Controls
- Built-in Tractor Feed
- Fan-fold Bypass for single sheet handling w/autoload
- 32KB memory for Buffer or Downloadable Fonts
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P341SL

- 216 cps Draft; 72 cps Letter Quality
- High Resolution Graphics
- Compatible with all best-selling software
- Qume Compatible
- Front Panel Controls
- Select Between 6 Unique Fonts per Page
- Auto Paper Loading and Single Sheet Guide
- 136 Characters per Line
- Parallel and Serial Interface

P351 S/P Model 2

- 300 cps Draft; 100 cps Letter Quality
- 180x360 Graphics Resolution
- Compatible with all best-selling software
- IBM Graphics Printer emulation
- Front Panel Controls
- Select Between 7 Unique Fonts per Page
- Bottom Paper Feed Standard
- 136 Characters per Line
- Parallel and Serial Interface

P351SX

- 360 cps Draft; 120 cps Letter Quality
- 360x360 Graphics Resolution
- IBM, Epson, Qume compatible
- Front Panel Controls
- 32-digit LCD
- Parallel and Serial Interface
- Auto Paper Loading

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STB VGA Extra EM-512K.....$394.95
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Archive 40MB Int.....$349.95
Archive 40MB Ext. Kit.....$479.95
Seagate ST225 w/Cont.....$262.95
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Seagate ST251 40MB.....$369.95
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PLUS 40MB Hard Card.....$659.95
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Seagate ST251-1 40MB.....$449.95
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120MB Internal 28mls.....$1,709.95
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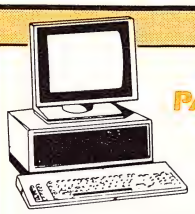

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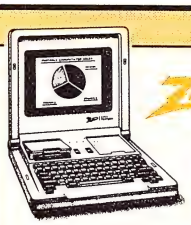

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Wordstar Pro 4.0	$229

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NEC Multisync II	$579
NEC Multisync Plus	$879
NEC Multisync GS	$199
NEC Multisync XL	$2049
Thomson Ultrascan	$449
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Packard Bell EGA	$369
Packard Bell VGA	$379
Princeton Ultrasync	$509
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ATI VIP VGA	$269
Compaq VGA	$409
Everex Enhancer	$135
Everex Edge	$179
Everex VGA	$249
Hercules Graphics Plus	$179
NEC GB-1	$209
NEC MVA 1024	$829
Paradise Autoswitch 480	$175
Paradise Professional	$379
Paradise VGA Plus	$259
Quadram VGA	$259
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Vega Deluxe	$199
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Everex 2400 External	$279
Hayes 1200	$279
Hayes 1200B Alone	$244
Hayes 1200B w/Software	$279
Hayes 2400 ext	$409
Hayes 2400B int	$377
Hayes 2400B w/software	$419
US Robotics 2400 int	$149
US Robotics 2400 ext	$162
US Robotics 1200 int	$84
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US Robotics HST 9600	$625
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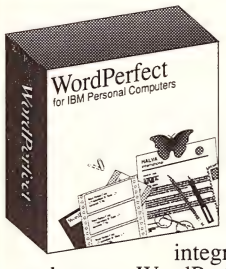

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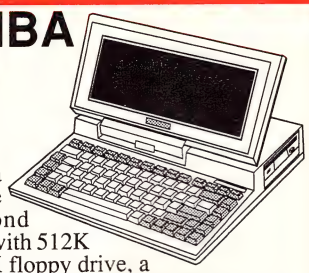
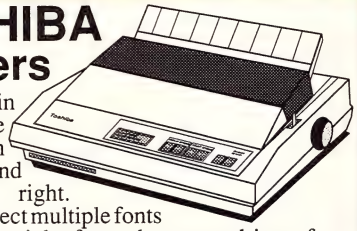
TOSHIBA T1000 $749



The Toshiba T1000 is the perfect second PC! It comes with 512K of ram, a 720K floppy drive, a supertwist LCD screen and MS-DOS in rom! All this in a battery-powered 7 pound package. A 768K ram card is just $269 and can be set as base, expanded, or a non-volitile ram disk.

TOSHIBA Printers



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P341SL Wide	**$629**

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180D	259	165
MSP40-55		Call
Tribute 124	699	449
Tribute 224	949	599
Diconix		
150P	499	299
Epson		Call
Fujitsu		
DL3400	995	549
NEC		
P2200	569	339
P5200	799	509
P5300	1049	669
P5XL	1295	Call
LC890	4799	Call
Okidata		
182 Plus	319	219
292 (Req. Interface)	539	349
320	499	329
390	699	469
393 (Req. Interface)	1399	915
Panasonic		
KXP1080i-2	299	159
KXP1091i-2	329	185
KXP1592	699	389
KXP1595	749	419
KXP1524	949	519
Star		
NX1000	289	169
NX2400	499	339
NB2410	699	449
Toshiba		
P321SL	749	459
P341SL	999	629
P351SX	1499	929

BOARDS

	LIST	FAST
AST		
Hot Shot 286	645	339
Six Pak Plus 64K	210	119
Everex		
1200B Int Modem	149	73
2400B Int Modem	249	149
Genoa		
Super EGA Hi-Res+	399	175
Super VGA #5100	445	239
VGA Hi-Res #5200	645	359
Hercules		
Graphic Card +	299	169
Intel		
8087-2	250	149
80287-8	410	239
80287-10	480	269
Above Board 286	645	Call
Orchid		
VGA	399	229
Designer VGA	545	299
Tiny Turbo 286	445	269
Twin Turbo 12mhz	645	369
Paradise		
Basic EGA	199	Call
Autoswitch 480	349	169
VGA Plus	399	259
VGA Professional	599	369
5 Pack 0K	129	59
Practical Peripherals		
1200B Int Modem	99	65
2400B Int Modem	199	149
Prometheus		
Promodem 2400B	199	129
Promodem 2400G	249	159
The Complete PC		
Answering Machine	349	219
Fax	499	319
Hand Scanner	249	159
USRobotics		
1200 Baud Internal	149	69
1200 Baud Internal	179	89
2400 Baud External	249	129
2400 Baud External	279	149
Video 7		
Fast Write VGA	549	335
Vega Deluxe	379	189
Vega VGA	499	259
V-RAM VGA	799	469

LAPTOPS

Mitsubishi		
MP-286L Dual	3195	1879
MP-286L 20mb	4595	2449
NEC		
Multispeed EL II	2295	1449
Multispeed HD	3695	2249
Sharp		Call
Toshiba		
T1000	1249	749
T1200F	2099	1369
T1200FB Backlit	2399	1499
T1200H	3499	2199
T1200HB Backlit	3599	2399
T3200	5799	3695
T5100	7499	4595
Zenith		
SuperSport Dual	2399	1599
SuperSport 20mb	3599	2399
SuperSport 286	4999	Call

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	LIST	FAST
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1280	999	669
210A	129	89
310A *Limited Offer!*	230	75
Magnavox		Call
Mitsubishi		
1409 RGB	399	259
1410 EGA	599	399
Diamond Scan 1381	799	489
NEC		
Multisync II	899	575
Multisync GS	279	189
Multisync Plus	1399	869
Princeton		
Max15	389	Call
Utltrasync	849	479
Sony		
1302 Multiscan	995	659
1303 Multiscan	825	499
Zenith 1490	999	599

DISK DRIVES

Miniscribe		
40MB AT #3650	499	319
Mitsubishi		
40MB AT MR535 22ms	825	399
Seagate		
20MB XT Kit #225	599	267
30MB XT Kit #238	699	287
30MB AT #138	599	299
40MB AT #251	899	349
80MB AT #4096	1199	599
Toshiba		
360K Floppy	119	77
720K 3.5" Floppy	149	87
1.2MB 5.25" Floppy	149	87

Call On Non-Listed Items

SOFTWARE

Database

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Clipper	699	379
DataEase	600	379
dBase III+	699	359
dBXL Diamond	199	105
Foxbase Plus	395	185
Paradox	725	399
Quartz	795	449
RapidFile	295	179
Rbase for DOS	700	419
Reflex	150	84
Q & A	349	179

Desktop Publishing

Byline	295	175
GEM Desktop Pub.	299	169
Pagemaker 3.0	795	Call
PFS:First Publisher	129	69
Publisher's Paintbrush	285	149
Ventura 2.0	895	459

Financial

Bedford Integr. Acct.	249	149
BPI		Call
Computer Associates		Call
DAC 3.0	99	59
DAC Payroll 3.0	99	59
Dollars & Sense	179	99
In-House Accountant	199	109
Managing Your Money	199	117
Peachtree Complete II	199	149

Graphics

	LIST	FAST
Boeing Graph	395	199
Deluxe Paint II	105	67
Draw Applause	495	269
Freelance Plus	495	Call
GEM Draw Plus	299	165
Generic CADD	99	49
Graph Plus	495	299
Harvard Graphics	495	Call
PrintMaster Plus	60	27

Integrated

First Choice	159	85
Works	149	89
Windows 286	99	59
Windows 386	195	117

Mice

Logitech C7 Serial/Bus	119	65
Logitech HiRes Bus	150	83
Microsoft Serial/Bus	150	95
Microsoft W/ Windows	200	129
PC Mouse II Serial/Bus	149	84

Power Protection

Curtis Ruby Plus	115	59
Datasheild 85	90	50
Datasheild 100	99	57
Isobar 4-6	80	42

Programming

	LIST	FAST
Macro Assembler	150	89
Norton Guides (Specify)	100	58
Turbo Basic	99	58
Turbo C 2.0 *New!*	149	87
Turbo Pascal 5.0 *New!*	149	87
Quick Basic	99	59
Quick C	99	59

Spreadsheets

Excel	495	Call
Lotus	495	Call
Lucid 3-D	149	79
Plan Perfect	395	189
Quattro	248	139
Worksheet Utilties	100	55

Utilities

CoreFast	149	87
Desklink	170	95
Desqview	130	73
Fastback Plus	189	87
Formtool	95	54
Laplink Plus	140	77
Norton Advanced	149	74
PC Tools Deluxe	80	36
Sidekick Plus	195	119
XTree	70	34

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	LIST	FAST
Easy Extra	99	55
GEM First Word Plus	199	117
Grammatik III	89	49
Manuscript	495	Call
Multimate Adv. II	565	247
Professional Write	199	105
Rightwriter	95	49
Sprint	195	119
Q & A Write	199	119
Webster's Writer	60	47
Word	450	Call
Word Perfect	495	Call
Word Perfect Library	129	59
WordStar Prof. 5.0	495	219
XyWrite III Plus	445	299

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Paper White VGA Mon.
1 Parallel / 2 Serial Ports
101 Key Keyboard
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1.2 Meg 5¼" Drive
1.44 Meg 3.5" Drive
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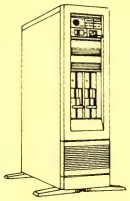

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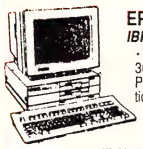

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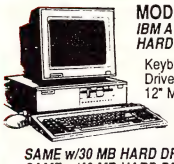

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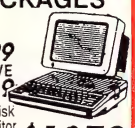

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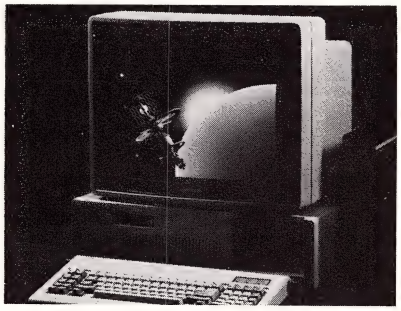

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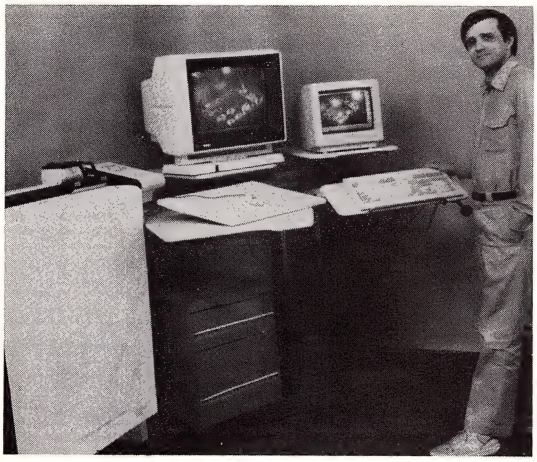

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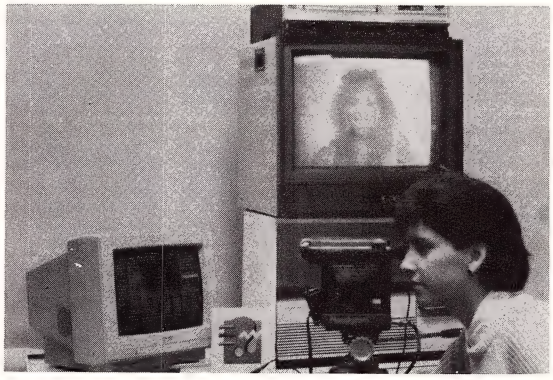

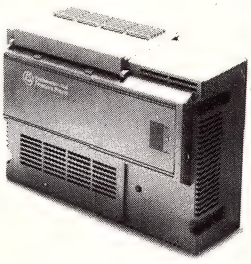

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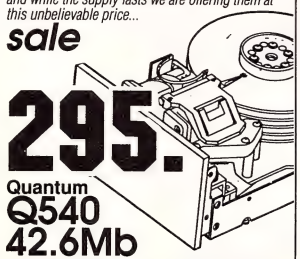

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SuperVGA,1024x768 ... 339.
Diamond Multi I/O,2s,p,g,c/XT .. 139.
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AT Serial I/O card ... 39.
XT/AT Game adapter port ... 29.
XT/AT EPROM programmer ... 149.
AT 3.5Mb w/Multi I/O, 0K ... 199.
AT SuperMULTI I/Ow/floppy ... 119.
PS/2 Multi I/O ... 99.
PS/2 Floppy controller 1.4Mb ... 89.
HP Laserjet 1Mb Ram card ... 349.

MOTHERBOARDS
XT Turbo w/BIOS, 8MHz ... 89.
XT Turbo w/BIOS, 10MHz ... 99.
AT 286 w/BIOS, 10 MHz ... 289.
AT Baby w/BIOS, 12MHz ... 299.
AT 386 w/BIOS, 16MHz ... 1499.

HARDWARE

AST Research
Xformer/286, 512K, 10MHz ... 699.
Advantage 2/386,mod.80,1Mb .. 725.
Advantage 2/286,PS/2,0K ... 349.
Advantage Premium 286,512K ... 389.
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AST Sixpakplus, 0K ... 119.

ATI Technologies
EGA Wonder 800 ... 199.
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2400etc int. Modem w/MNP-5 ... 188.

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GULFSTREAM
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Graphics Card Plus ... 174.

INTEL
Inboard 386/PC to 386 ... 975.
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8087 (5MHz) ... 102.
8087-1 (10MHz) PS/2 ... 205.
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80287-6 (6MHz) ... 185.
80287-8 (8MHz) ... 255.
80287-10 (10MHz) ... 309.
80387-16 (16MHz) ... 549.
80387-20 (20MHz) ... 799.

ORCHID Technology
Tiny Turbo 286 -*REDUCED!* ... 289.
Designer VGA Board ... 299.
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Prosync(640x480,752x410) ... 269.
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Liberty EMS XT card, 0K ... 98.
Silver Quadboard, Sixpak comp. ... 98.

VIDEO 7
VEGA Deluxe ... 199.
Vega VGA ... 299.

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Advanced PC Keyboards
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CH Products
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Mach II Joystick-Apple ... 39.
Mach III Joystick-IBM ... 49.
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Gamecard III ... 39.

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Bus Mouse w/PC Paintbrush ... 105.
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MSC Technologies
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SUMMAGRAPHICS
SummaSketch ... 449.

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PC3B Adapter card PC/XT/AT .. 189.
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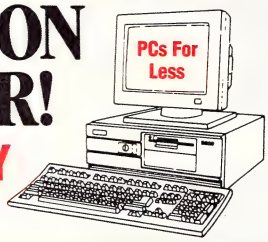

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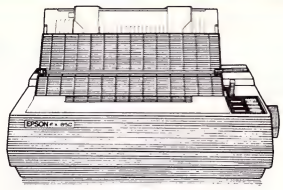
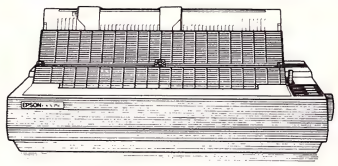


Epson's high-speed FX-850 dot-matrix computer printer is equipped with outstanding performance features.

- Narrow-carriage 9-pin, dot-matrix printer.
- SmartPark,™ a unique Epson paper-handling innovation, lets you switch from fanfold to single sheets or envelopes without removing hardware or paper.
- With a standard push feed tractor and single sheet friction feed, the FX-850 can handle virtually any type of paper as well as envelopes.
- Exclusive SelecType front control panel puts popular printer features and SmartPark operations at your fingertips.
- The FX-850 prints 264 characters per second (CPS) in high-speed draft mode (12 CPI); 54 CPS in Near Letter Quality mode (12 CPI).
- Insulated for quiet operation.
- Optional cut sheet feeder and pull tractor are available.
- Backed by Epson's one year limited warranty.



Epson's high-speed FX-1050 dot-matrix computer printer is equipped with outstanding performance features.

- Wide-carriage 9-pin, dot-matrix printer.
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- Exclusive SelecType front control panel puts popular printer features and SmartPark operations at your fingertips.
- The FX-1050 prints 264 characters per second (CPS) in high-speed draft mode (12 CPI): 54 CPS in Near Letter Quality mode (12 CPI).
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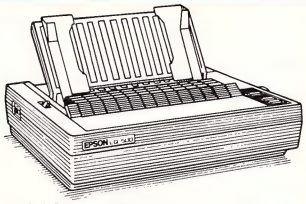

Epson's LQ-500 is a high-resolution, Letter Quality computer printer with outstanding performance features and remarkable value.

- Epson's 24-pin, dot-matrix technology creates true letter quality characters and high-resolution graphics
- Prints 180 characters per second (CPS) in draft mode; 60 CPS in letter quality (12 CPI)
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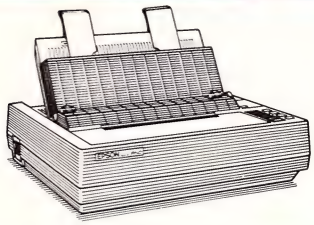
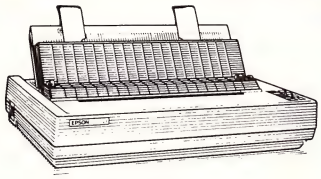


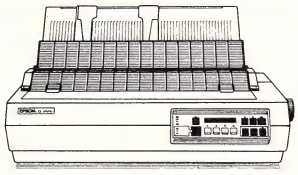
The standard width LQ-850 is a high-resolution, Letter Quality computer printer with outstanding performance features.

- Epson's 24-pin, dot-matrix technology creates true letter quality characters
- SmartPark,™ Epson's unique paper handling feature, lets you change from fanfold paper to single cut sheet paper or envelopes without removing the tractor hardware or paper
- 264 Characters per second in the high-speed draft mode delivers outstanding productivity
- 88 Characters per second in Letter Quality mode for enhanced, high-resolution characters
- In draft mode or letter quality mode, the LQ-850 runs at a surprisingly quiet 55 dB noise level
- Exclusive SelecType front control panel offers quick, easy selection of popular typestyles, fonts and pitch
- The LQ-850 is backed by Epson's one year limited warranty



The wide carriage LQ-1050 is a high-resolution, Letter Quality computer printer with outstanding performance features.

- Epson's 24-pin, dot-matrix technology creates true letter quality characters
- SmartPark,™ Epson's unique paper handling feature, lets you change from fanfold paper to single cut sheet paper or envelopes without removing the tractor hardware or paper
- 264 Characters per second in the high-speed draft mode delivers outstanding productivity
- 88 Characters per second in Letter Quality mode for enhanced, high-resolution characters
- In draft mode or letter quality mode, the LQ-1050 runs at a surprisingly quiet 55 dB noise level
- Exclusive SelecType front control panel offers quick, easy selection of popular typestyles, fonts and pitch
- The LQ-1050 is backed by Epson's one year limited warranty



Epson's advanced LQ-2550 is a powerful and versatile printer delivering superior print quality and paper-handling performance over a full range of business printing needs.

- 24-Pin technology creates superior Letter Quality characters and high-resolution graphics up to 360 dpi.
- 7-Color printing capability is standard.
- Epson's exclusive SmartPark™ lets you change from fanfold to cut sheet paper or envelopes without removing hardware or paper. Features top-of-form micro-adjustment and short form tear-off.
- Exclusive LCD SelecType front control panel for easy selection of pre-sets, fonts and printer functions.
- 133 Characters per second print speed in Letter Quality mode (12 CPI).
- 400 Characters per second print speed in draft mode (12 CPI).
- Epson LQ ESC/P™ assures software compatibility.
- Insulated for quiet operation.
- Options include dual-bin cut sheet feeder, pull tractor and 32K buffer.
- Backed by Epson's one year limited warranty.

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48ms	48ms	70ms*	28ms*	16ms*
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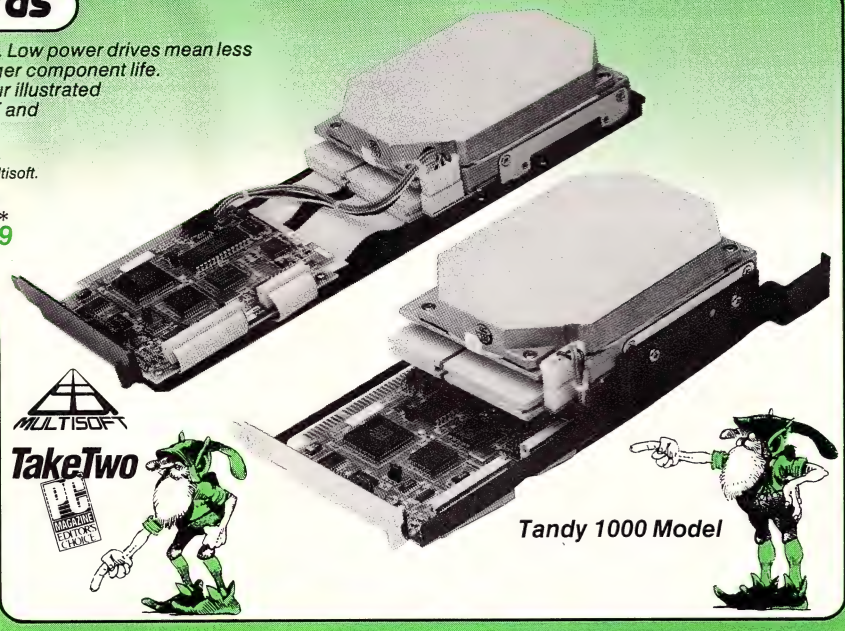
* *Average access speed per partition*

Tandy 1000/A/SX/TX/TL/SL Leprecards add $20



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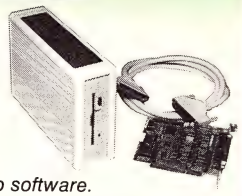
Internal kits for PC/XT/AT computers include 5¼" mounting brackets, black & gray face plates, and AT rails. 1.44MB for PC/XT includes high speed Western Digital controller.



FREE TAKE TWO *floppy backup software.*

720 Kit	1.44MB for AT	1.44MB for PC/XT
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- *Optional: 150 watt, UL/FCC approved power supply for IBM PC's $69*

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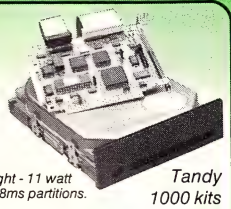

Tandy 1000 kits add $20

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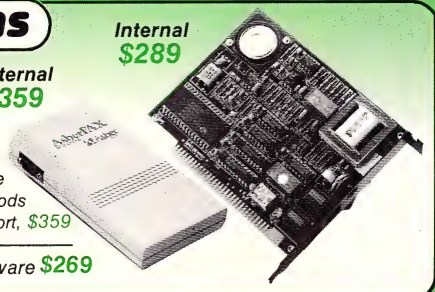

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2400 Modems

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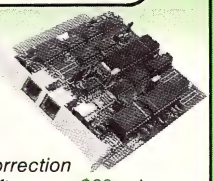

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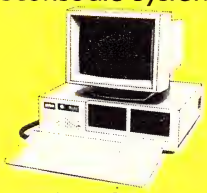

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- 80386 32-Bit 16/20 MHz Microprocessor with Dual Master Capability
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- 16 MHz, 0 Wait State / 20 MHz, 0 Wait State
- Optional: 80287 Math Coprocessor or 80387 Math Coprocessor (Sockets on CPU Board)
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Scottsdale Systems 286

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- Storage Devices: Capacity for 5 Half-Height Drives
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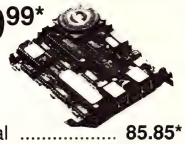

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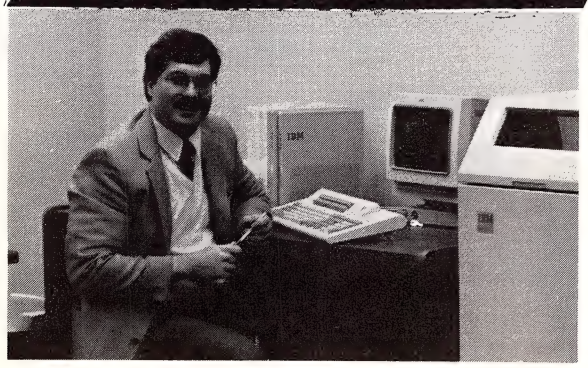

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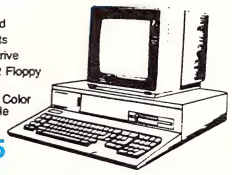

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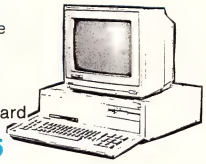

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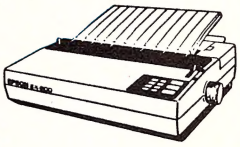

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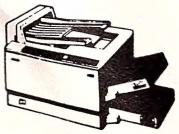

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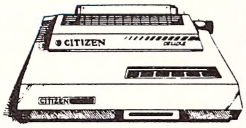

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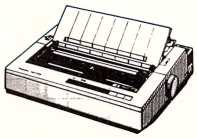

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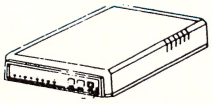

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Plain English, Please

Joan Hope

I belong to no PC user group, subscribe to no computer publications, and can never remember how to pronounce "DOS." I know how to turn on my PC, run my word processing program, make copies of my files, and turn off the PC. In other words, I am a typical PC user.

As a college English teacher and graduate student, I use my PC almost exclusively for word processing. It has changed my whole approach to writing and drastically improved the final product. But it saves me neither paper nor time, because I make many more drafts than I would using a typewriter and still make revisions in longhand.

The other academics and writers I know are no different. PCs have become as indispensable to us as our dictionaries, but since we use them for only a few specific tasks, there's no reason to keep up with PC technology, much less the latest jargon. We have a tough time getting along in a world of computer jocks who flash the latest buzzword like a membership badge. Computer product instructions (when there are any) are written for insiders.

The PC I bought two years ago came without assembly instructions. After putting all the components where I thought they belonged, I discovered that I didn't know how to plug the thing in (yes, this is a true story). A friend—a Ph.D. candidate in computer science—helped me figure out that the power cord was missing. A simple parts list and assembly diagram would have saved me an hour of frustration. Fortunately, that same friend installed DOS and configured the system for me, a favor for which I am still grateful.

Now that I am familiar with the most common commands, my DOS user's guide serves as a handy reference. But it's obviously written for people who already know the answers. I can never find the solutions to my problems and invariably end up calling friends for help. As for my GW BASIC programmer's guide, I haven't gotten past that part of the introduction that reads, "GW BASIC ... provides sophisticated string handling, structured programming features, and improved graphics." I know what "improved graphics" means—I think.

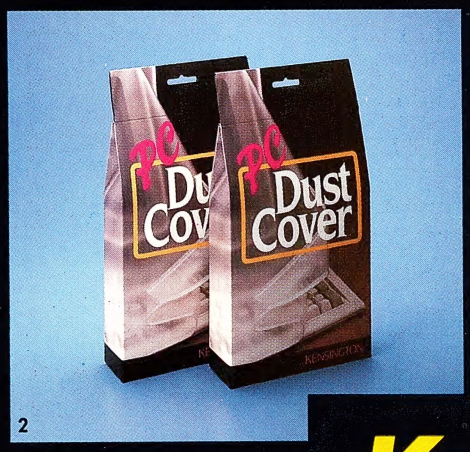
My *WordStar Professional* manual is better, but even that has left me stranded a few times. For example, it explains how to protect and unprotect files using the opening menu, but on several occasions I've hit the wrong key and accidentally protected files while editing them. The manual doesn't tell me how to undo the mistake while in edit mode, so I have no recourse but to exit my file and lose any changes I've made.

I suggest that computer vendors find a different kind of writer to prepare their instruction manuals. MicroPro says it chooses skilled writers who are also technically competent, but I say technical competence is a handicap. The ideal candidate is a good writer who knows little about computers and nothing about the product in question. We need documentation written by people who understand the common user's problems. Companies could simply make a technician available to answer the writer's questions while he or she focuses on translating computer gibberish into plain English. Graduate humanities programs are full of qualified candidates who could use the work.

Joan Hope is a doctoral candidate in English at Indiana University at Bloomington.

Have a different perspective? Write Dan Lavin, user ombudsman, PC World, *501 Second St., San Francisco, CA 94107.*

GREG WHITAKER



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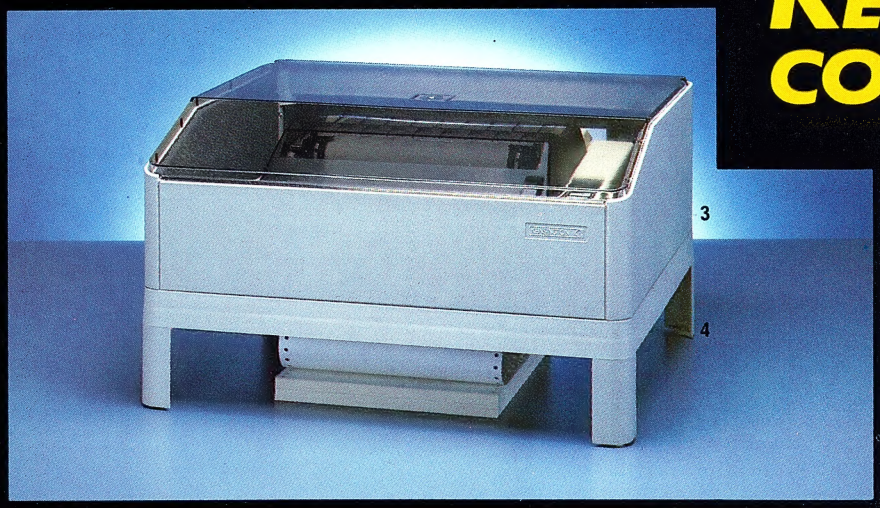

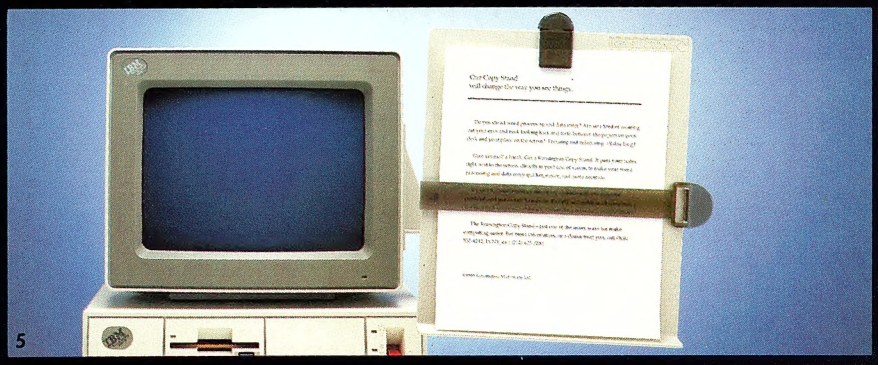

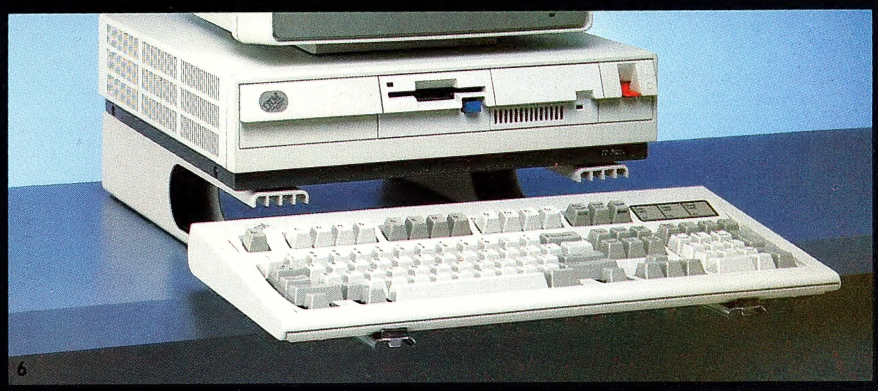

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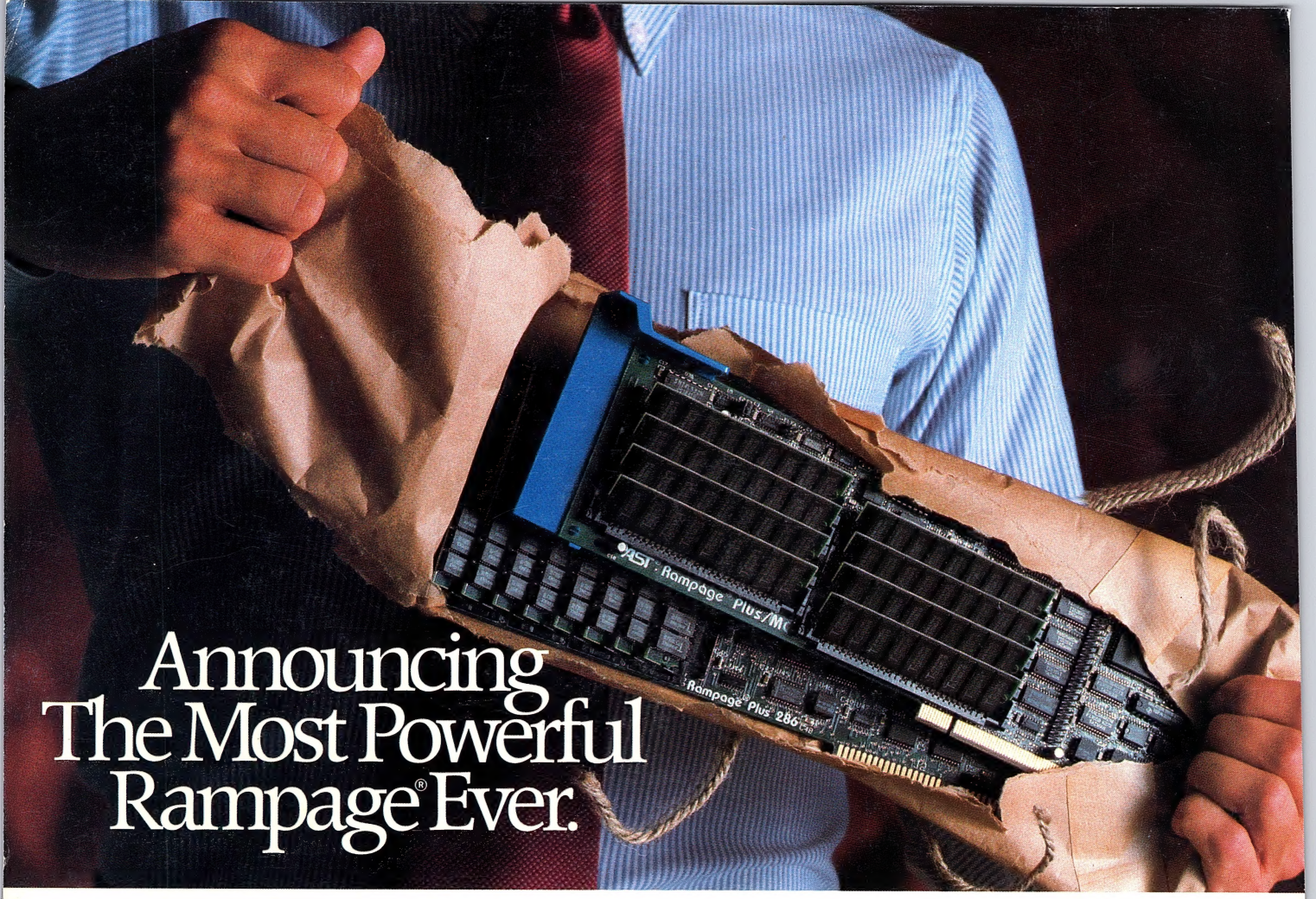

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